Gone But Not Forgotten:
The Role of Unacceptable Options in Decision Making

Katrien Wijnen

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Advisor: Prof. Patrick Van Kenhove
Co-advisors: Prof. James R. Bettman and Prof. Joel Huber

DOCTORAL JURY

Prof. Dr. James R. Bettman
(Fuqua School of Business, Duke University)

Prof. Dr. Patrick De Pelsmacker
(Antwerp University, Ghent University)

Prof. Dr. Maggie Geuens
(Ghent University)

Prof. Dr. Joel Huber
(Fuqua School of Business, Duke University)

Prof. Dr. Eddy Omey
(Ghent University)

Dean Prof. Dr. Roland Paemeleire
(Ghent University)

Prof. Dr. Patrick Van Kenhove
(Ghent University)

Prof. Dr. Iris Vermeir
(Ghent University)

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my parents, and my brother,

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SAMENVATTING

Situaties zijn talrijk waarbij consumenten overgaan tot een stapsgewijze inkrimping van het aantal keuzemogelijkheden, en dit door het wegstrepen van alternatieven die niet voldoen aan welbepaalde criteria. Intuïtief zou men veronderstellen dat eens een keuzemogelijkheid geschrapt is van de lijst, zij geen invloed zal hebben op het verdere keuzeproces, en meerbepaald op de finale keuze. Dit proefschrift doet een beroep op een fenomeen dat uitvoerig bestudeerd is in de wetenschappelijke literatuur, namelijk "keuze gestuurd door context". Hieruit blijkt dat het toevoegen van een extra keuzemogelijkheid aan een lijst met twee opties, de oorspronkelijke keuze tussen deze twee kan wijzigen, en dit door het creëren van welbepaalde relaties tussen de opties. Twee voorbeelden van dergelijke relaties zijn "asymmetric dominance" en "compromise", respectievelijk gedefinieerd als "de extra keuzemogelijkheid is gedomineerd door slechts één van beide oorspronkelijke opties, waarbij de term gedomineerd aangeeft dat deze extra optie slechter scoort op tenminste één van de aanwezige productkenmerken en een gelijke of slechtere score behaalt op al de overige kenmerken" en "één van beide oorspronkelijke opties wordt een tussenoplossing, hetgeen inhoudt dat haar productscores gelegen zijn tussen die van de overige opties." In het kader van deze twee contexten, toont een eerste studie aan dat de aanwezigheid van een "absoluut onaanvaardbare" optie in de lijst de finale keuze tussen de overige alternatieven wel degelijk stuurt. Een absoluut onaanvaardbare optie is hier gedefinieerd als "een product dat niet voldoet aan een zekere minimum eis voor een welbepaald kenmerk en hierdoor wordt verworpen wat ook haar scores op de overige kenmerken mogen zijn." Een tweede studie richt zich vervolgens op het doen afnemen van deze vertekenende invloed van de absoluut onaanvaardbare optie op de finale keuze (toegepast op de "asymmetric dominance" context), en dit door het benadrukken van de onaanvaardbaarheid van de optie. Ten gevolge van deze

extra aandacht wordt de respondent zich misschien bewust van een mogelijke beïnvloeding door de onaanvaardbare optie, hetgeen vervolgens kan leiden tot correctie. Concreet wordt aan de respondenten gevraagd om in een eerste stap absoluut onaanvaardbare scores en overeenkomstige opties aan te duiden, en om in een tweede stap een keuze te maken uit een lijst waarin deze onaanvaardbare opties nog steeds zijn opgenomen en waarbij de onaanvaardbare scores in het rood vermeld staan, aangevuld met een rode asterisk. De bekomen correctie blijkt slechts matig te zijn.

Deze eerste twee studies suggereren dat een onaanvaardbaar alternatief in de lijst de finale keuze tussen de overige alternatieven stuurt, en zelfs het vestigen van extra aandacht op deze onaanvaardbare status lijkt dit effect niet teniet te doen (hetgeen mogelijk wijst op een onbewust onderliggend proces). Een derde studie bevat een strengere test van het effect van de onaanvaardbare optie door de onaanvaardbaarheid van de optie reeds van bij aanvang duidelijk te stellen, in die zin dat de respondenten de overige scores van deze optie niet moeten bekijken alvorens dit te ontdekken. Aan de respondenten werd gevraagd om zich in te beelden dat ze een digitale fotocamera gingen kopen voor een goede vriend(in), rekening houdend met zijn (haar) eisen (b.v., “Ik wil zeker een broekzak model. Elk groter of kleiner model is voor mij absoluut onaanvaardbaar, dus ik wil niet dat je een dergelijke camera voor mij koopt wat ook de scores op de overige kenmerken mogen zijn”) en voorkeuren. Het hanteren van een restrictie enkel ten aanzien van het kenmerk “grootte”, in combinatie met zijn linkse positie in de keuzematrix, verzekerde dat dit kenmerk eerst bekeken werd in de loop van het keuzeproces. Onder deze strictere operationalisatie bleef een effect van de onaanvaardbare optie op de finale keuze uit (en dit voor zowel de “asymmetric dominance” als de “compromise” context). Het is nu echter mogelijk dat de eerder rechttoe, rechtaan instructies gegeven door de onderzoeker (onder het mom van de goede vriend(in)) met betrekking tot de grootte van de camera (zie termen zoals “absoluut onaanvaardbaar” en “wat

ook de scores op de overige kenmerken mogen zijn"), een "demand effect" hebben veroorzaakt. Dit houdt in dat de respondenten misschien dachten dat er van hen verwacht werd dat ze de niet-broekzak modellen onmiddellijk zouden schrappen van de lijst, inclusief de verdere informatie die deze modellen bevatten (onder de vorm van de scores op de overige kenmerken).

Toekomstig onderzoek kan een oplossing bieden voor dit mogelijk "demand effect" probleem door een minder expliciete onaanvaardbaarheid instructie te gebruiken, er wel zorg voor dragend dat de onaanvaardbaarheid van bij aanvang duidelijk is. Zo kan bijvoorbeeld de plattegrond van een studentenkamer een restrictie weergeven ten aanzien van de grootte van een koelkast, en het zo mogelijk maken om woorden zoals "absoluut onaanvaardbaar" en "restrictie" te bannen uit de inleiding. Het is dan aan de respondent om bij het kiezen van een koelkast zelf de beperking ten aanzien van de grootte in rekening te brengen. Daarenboven kan een toekomstige studie de mate van cognitieve elaboratie manipuleren om zo te onderzoeken of de invloed van de onaanvaardbare optie steunt op een onderliggend onbewust, of bewust correctie proces afhankelijk van de specifieke context die ontstaat door de toevoeging ervan aan de lijst. Studie 3 bevat een eerste, voorzichtige analyse die in die richting wijst.

Samengevat, het al dan niet beïnvloeden van het verdere keuzeproces door de onaanvaardbare optie hangt af van factoren zoals: is de onaanvaardbare status duidelijk van bij aanvang, worden de overige scores van de onaanvaardbare optie verder bekeken (eventueel onbewust), en veroorzaken de specifieke relaties tussen de keuzeopties al dan niet een onderliggend proces dat bewust is, en dus een correctie of een verderzetting van de impact van de onaanvaardbare optie. Hopelijk leidt het inzicht verworven in dit proefschrift tot een meer geïntegreerd raamwerk ten aanzien van de rol die absoluut onaanvaardbare

opties spelen in keuzeprocessen, waarbij de eerder aangehaalde suggesties voor verder onderzoek een volgende stap zijn in die richting.

SUMMARY

In many situations consumers engage in a phased narrowing of choice options, editing out options that fail to meet some acceptable criteria. Intuition would suggest that once an option has been edited out of the choice set, it should not have any impact on subsequent choices. This dissertation draws upon a well-known phenomenon called "context effects on choice" that shows that the introduction of an additional option in the choice set changes the choice between the original pair of options by creating specific relationships between the options in the set. "Asymmetric dominance" and "compromise" are two such relationships, the former defined as "the additional option is dominated by only one of the two original options, with dominated meaning that it scores worse on at least one attribute and is equivalent or inferior on all other attributes," and the latter as "one of the two original options becomes a middle option, meaning that its attribute values are between the values of the other alternatives" respectively. For the case of these particular contexts, study 1 shows that the presence of a "truly unacceptable" option in the choice set influences the final choice between the remaining options. A truly unacceptable option is defined as "an alternative not satisfying a minimum acceptable threshold on a rejection inducing dimension, such that the option would be rejected by the decision maker regardless of its other features." Study 2 focuses on reducing the unacceptable option's contaminating effect on final choice (for the asymmetric dominance setting), attempting to trigger a correction process by making the option's unacceptability more salient in the set. Participants are asked to mark truly unacceptable levels and corresponding options in an initial phase, and they subsequently make a choice within a set still listing the screened out option(s) with the unacceptable level(s) in red and marked with a red asterisk. Only a moderate correction of the unacceptable's influence is found.

In combination, studies 1 and 2 suggest that the presence of a truly unacceptable option in the choice set affects the final choice between the remaining alternatives and that even drawing people's attention to the option's unacceptable status does not seem to nullify its effect (perhaps suggesting a nonconscious process). Study 3 provides a stronger test of the unacceptable option's effect by making the unacceptable status clear from the beginning, so that individuals do not have to process values other than the unacceptable aspect before finding this out. For this participants had to imagine that they had been asked by their best friend to buy him/her a digital photo camera, with the friend listing demands (e.g., "I definitely want a pocket-sized model. Any larger or smaller model is truly unacceptable to me, so I don't want you to buy such a camera for me no matter what else it has to offer") and preferences with regard to the camera. The introduction of a constraint on the size attribute, together with its left position in the choice matrix, assured it was the first attribute focused on during the choice process. Under this more stringent condition an effect of the unacceptable option on the subsequent choice was no longer found (this holds for both the asymmetric dominance and the compromise setting). However, the rather blatant instructions given by the experimenter (under the guise of the friend) with regard to the camera's size level (using terms such as "truly unacceptable to me", "don't want you to buy such a camera", and "no matter what else it has to offer") might have created a demand effect. That is, participants might have felt they were expected to immediately prune a medium-sized camera from the decision structure, together with the further information it contains.

The above issue could be resolved in a future study, using a less explicit unacceptability instruction, still making sure that the unacceptable status is clear from the beginning. For example, a student flat's floor plan could be used to introduce a constraint on the refrigerator's size, as such excluding words such as "truly unacceptable" and "constraint" from the introduction. It is up to the participants to take the size constraint into account at the moment they

are deciding between the different refrigerators in the choice table, which is thought to be a common practice in daily life. In addition this future study could manipulate the level of cognitive elaboration participants engage in to examine whether the unacceptable option's influence runs through a nonconscious versus conscious correction process depending upon how the unacceptable option adds to the final choice context (i.e., by making one of the original options a dominating or a compromise option), as suggested by some preliminary findings in study 3.

In sum, whether unacceptable options affect further decision making is dependent upon factors such as whether the unacceptable status is clear from the beginning, whether values other than the unacceptable aspect are examined further (perhaps unconsciously), and whether the type of relationship defined between the options in the set by the addition of the unacceptable option causes the underlying process to be conscious or not, thus leading to a correction or a continuation of the unacceptable option's effect. Hopefully, the knowledge gathered in this dissertation leads to a more integrated framework for the role of unacceptable options in decision making, with the suggestions for future research being a next step in this direction.

CHAPTER I :

INTRODUCTION

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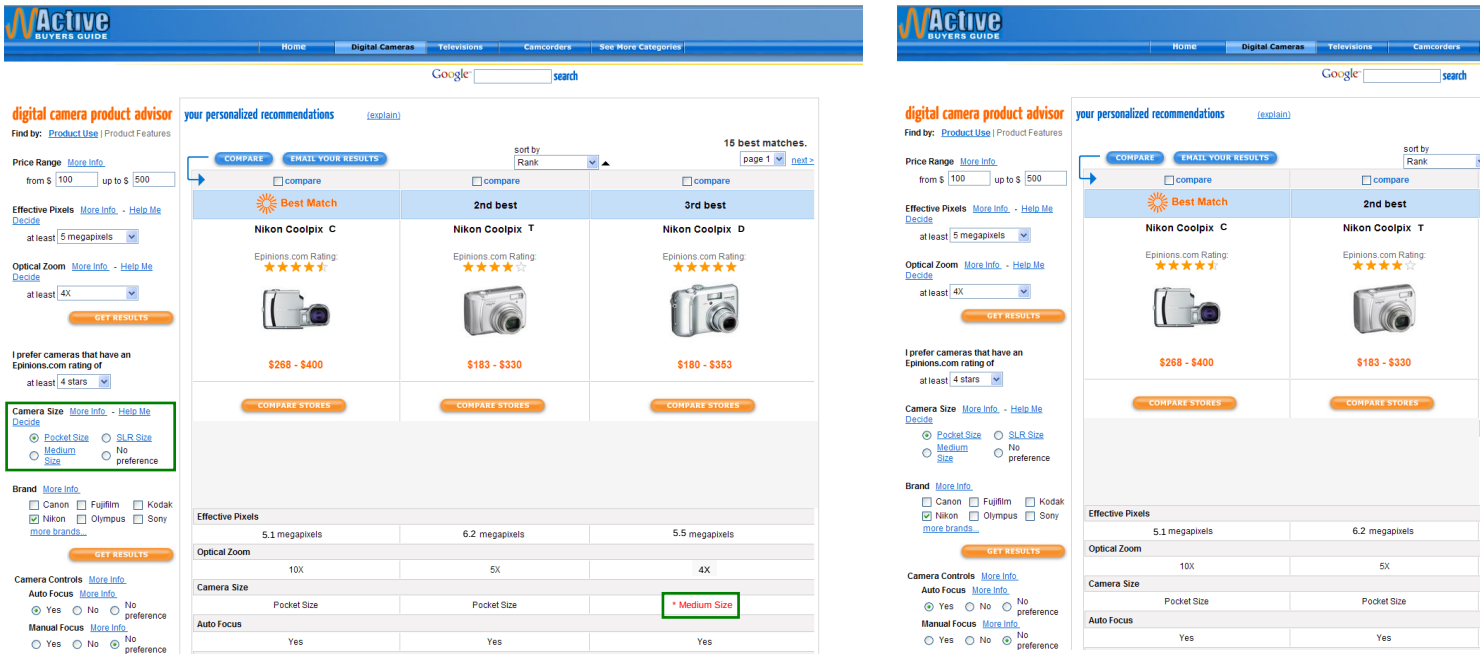
Imagine that Mr. Jones wants to buy a digital photo camera and uses a recommendation agent website to find the brand that suits him best. On the website, he first defines his desires, including levels of attributes that are truly unacceptable (e.g., the desired size is pocket size, and a model of another size will not be bought no matter what else it has to offer; figure 1). Subsequently, the website recommends a list of brands. How will Mr. Jones choose when this list includes an option with a truly unacceptable size (e.g., a medium-sized camera)? Defining "truly unacceptable" as one which Mr. Jones in fact will not choose, the question we raise is whether he will choose a different brand from the one he would have chosen if this truly unacceptable option were not included. That is, does the presence of a truly unacceptable option in the choice set affect the consumer's choice among the remaining options?

Figure 1: Problem specification – Truly unacceptable option included/excluded



Intuitively, such truly unacceptable options should not influence final decision making, yet the use of these options in the real world (e.g., compusa.com, activebuyersguide.com, my-productadvisor.com) suggests that they may be effective at influencing subsequent behavior.

In the decision making literature, a common assumption is that truly unacceptable options are eliminated in an initial editing phase and do not influence subsequent choices (e.g., Lussier and Olshavsky 1979; Nichols-Hoppe and Beach 1990; Olshavsky 1979; Park 1978; Payne 1976). We argue for a more subtle role for the truly unacceptable option, namely that information characterizing the unacceptable can play a role in the further decision process by helping to define the context (i.e., the relationships between the options in the set) within which the final choice is made.

Another example of a so-called "irrelevant and nonessential" option is the "phantom" alternative, defined by Pratkanis and Farquhar (1992) as "a choice option that looks real but is unavailable at the time a decision is made." Examples of phantoms include the withdrawal of a preferred job candidate and the liked product being out-of-stock. Farquhar and Pratkanis (1993) argue that many current theories hold that unavailable alternatives should be pruned from the decision structure (e.g., Luce's (1959) choice axiom and Hammond's (1986) consequentialism). Such principles would lead not only to the elimination of the phantoms themselves but also to the information they might contain about the context of decision making or about constraints on the availability of options. They include the following concrete example: "newcomers to a community often compare a range of options currently for sale on the real estate market. Before evaluating properties, it is useful though to compare several properties that have recently sold (i.e., phantoms) with the currently available alternatives." The importance of this information follows from the fact that research has shown phantom alterna-

tives to impact consumer judgment and choice (e.g., Farquhar and Pratkanis 1993; Fitzsimons 2000; Highhouse 1996; Pettibone and Wedell 2000).

The conclusions reached for the phantom alternative do not automatically hold for the truly unacceptable option, however. An unacceptable option is an "inferior" irrelevant alternative and the unavailable phantom is a "superior" irrelevant alternative. Following Seidl and Traub (1996) an inferior irrelevant alternative can be defined as "an alternative that is added to the choice set, but where this alternative is, because of its obvious inferiority, never chosen", and a superior irrelevant alternative as "a choice alternative which is considered to be a best choice. However, in the course of the decision process it becomes apparent that it is not available; for some reason it drops out of the set of choice alternatives." Whether an alternative is strictly inferior or is superior but not available may influence the decision process in different ways.

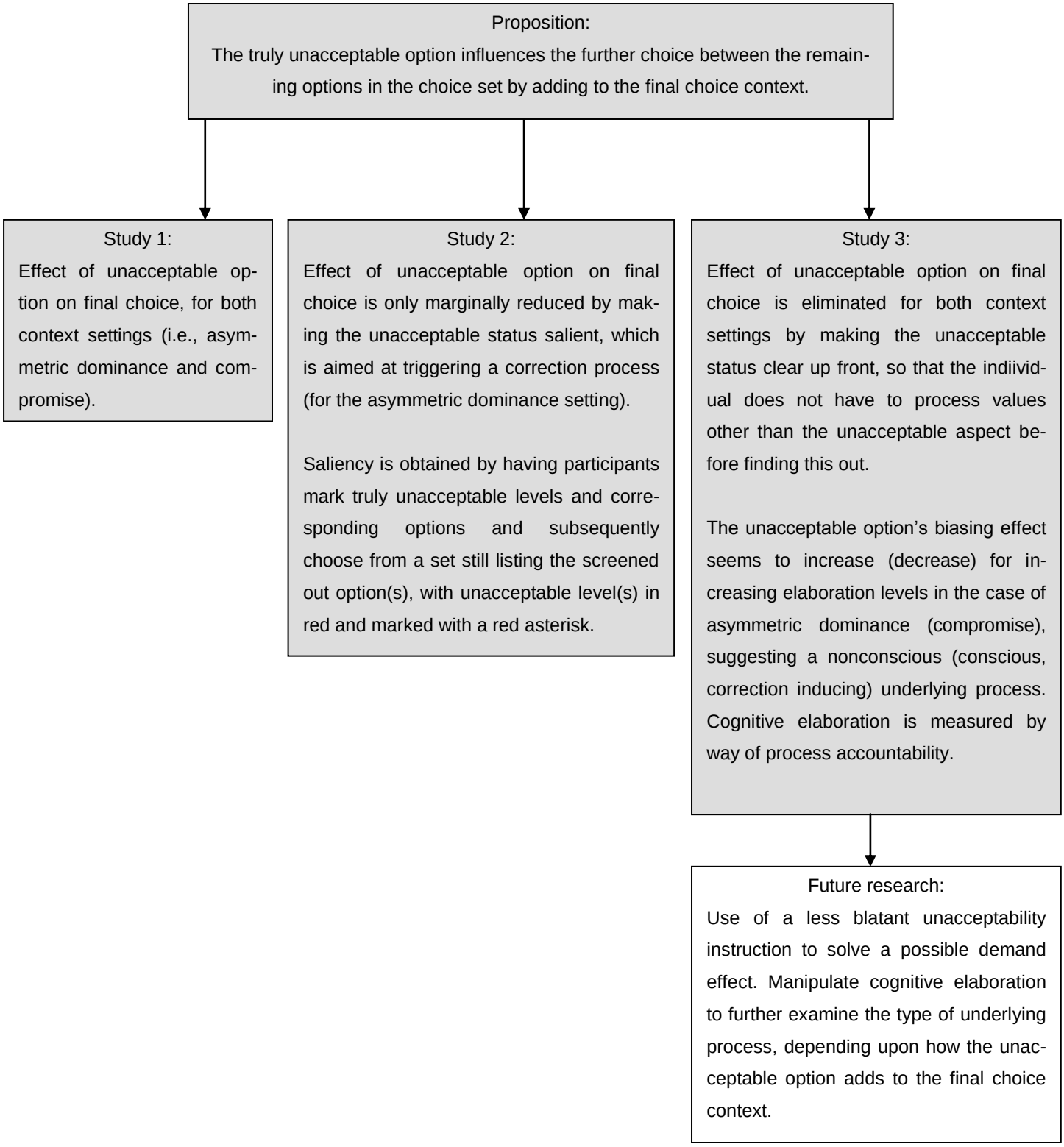
An influence of the truly unacceptable option on final choice would run counter to normative models of choice asserting that preferences are determined only by relevant alternatives and guided by an internal, stable utility function. Instead it would be consistent with the notion of constructed choice processes (Bettman, Luce, and Payne 1998), the new "standard model" for behaviorally-oriented consumer researchers. For example, the phenomenon of preference reversals, showing in the domain of gambles that people will often choose gamble A over B but pay more for B than A when the options are priced separately (Lichtenstein and Slovic 1971; Tversky, Sattath, and Slovic 1988), has led to the suggestion that choice is less about choosing with regard to an underlying set of preferences than it is about constructing preferences at the time the choice is made (Griffin, Liu, and Khan 2005).

The influence of truly unacceptable options on the decision process has both theoretical and managerial importance. Theoretically, the presence of truly unacceptable options influ-

ences the definition of the choice context and which particular option is chosen from the final reduced set; such influence should make the role of the unacceptable option in choice an important focus in decision making research. From another perspective, the distinct role of context in decision making would once again be confirmed, as context will matter even if it is defined by an option that is truly unacceptable. Managerially, knowledge of the effect of the unacceptable on the further process may lead to the addition of a truly unacceptable (perhaps even imagined) option to the set (e.g., by a recommendation agent such as activebuyersguide.com), not to generate direct sales, as the option will never be chosen, but to increase the profitability of the product line by influencing the consumer to buy the more profitable option. To serve consumers' interests it may be advisable to make them aware of such biasing practices; when confronted with unacceptable options in the set, consumers should ask themselves the following questions and debias if appropriate: what does the source of my information have to gain? Why is this particular option being presented to me (in this way)? Would my final choice be different if the unacceptable option and the information it contains were eliminated from the start?

The present dissertation is organized as follows: first, we take a look at the relevant decision making literature. Second, we define a truly unacceptable option, to subsequently introduce the well-known context effects, asymmetric dominance and compromise. Then we show how they are affected by the unacceptable option to test the proposition that unacceptable options influence the choice process between the remaining options in the choice set by helping to define the choice context. We then develop alternative hypotheses regarding whether the unacceptable option impacts final choice (chapter 2). Next, we present results of a first study examining these hypotheses, followed by two additional studies (chapter 3), detailed further in figure 2. Finally, we conclude with a summary and general discussion (chapter 4).

Figure 2: Analytical road map



CHAPTER II :

THEORETICAL DEVELOPMENT

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II.1 A LOOK AT THE DECISION MAKING LITERATURE

Several decades of research have contributed to the decision making literature as we know it today. During this time the consumer has evolved from a rational decision maker to a decision maker with bounded rationality, an adaptive or constructive decision maker, and a more unconscious one.

II.1.1 THE RATIONAL DECISION MAKER AND BOUNDED RATIONALITY

"The rational decision maker has well defined preferences that do not depend on particular descriptions of the options or on the specific methods used to elicit those preferences. Each option in the choice set is assumed to have a utility, or subjective value, that depends only on the option. Finally, it is assumed that the consumer has ability or skill in computation that enables the calculation of which option will maximize his or her received value and selects accordingly." (Bettman et al. 1998) This normative point of view of consumers having stable and well defined tastes (Simonson 2005) and maximizing utility was challenged by Simon in 1955. He argued that decision makers have limitations on their capacity for processing information, including limited working memory and limited computational capabilities. This concept of bounded rationality implies that the decision maker does not have a master list of preferences, that are merely revealed when making a choice, but that preferences will be constructed on the spot (Bettman et al. 1998). There is not one invariant algorithm (e.g., the weighted adding model; for a defintion see below) that is applied to all choices, instead several different approaches will be used critically depending upon the properties of the

task environment (Payne 1982). As a consequence, choice may become dependent upon such irrelevant factors as the options' descriptions (e.g., framing outcomes as gains versus losses) or the elicitation methods used (e.g. choose versus determine a price), as such violating the normative principles of "description invariance" and "procedure invariance". An example of the framing effect is the following (Tversky and Kahneman 1986): respondents are asked to assume themselves $300 richer and are then offered a choice between a sure gain of $100 or an equal chance to win $200 or nothing. Alternatively, they are asked to assume themselves $500 richer and are offered a choice between a sure loss of $100 and an equal chance to lose $200 or nothing. Although these two problems are essentially identical with respect to the final outcome, most participants who choose between gains predictably prefer the $100 for sure, whereas most participants who choose between losses prefer the probabilistic $200 gamble. Because outcomes can be framed either as gains or as losses relative to some reference point, and because risk attitudes vary depending upon whether gains or losses are at stake (i.e., risk-averse attitudes in the domain of gains and risk seeking in the domain of losses), alternative frames may lead to contradictory preferences with respect to the final outcome (Tversky and Kahneman 1981, 1986).

II.1.2 THE ADAPTIVE DECISION MAKER

The different strategies used by an individual when making a judgment or a choice may be categorized on four different aspects (Payne et al. 1992): (1) the total amount of information processed, ranging from exhaustive consideration of all available information to more cursory consideration of a subset of the information. For example, a digital photo camera choice may involve a detailed screening of much of the information available about each of the cameras, or it may show only a superficial consideration of a limited set of information (e.g., choosing the brand one chose last time out of a set of three different brands); (2) the

selectivity in information processing, that is the degree to which the same amount of information is examined for each alternative or attribute (consistent processing) or the amount varies (selective processing). For example, suppose Mr. Jones wants to buy a digital photo camera and considers the cameras presented in figure 1. He decides that optical zoom is the most important attribute, processes only the information on this attribute, and finally chooses model C, as this option obtains the best score on the optical zoom attribute. This choice process involves highly selective processing of attribute information (since the amount of information examined differs across attributes: all levels of the optical zoom attribute are examined, whereas none of the levels of the resolution attribute are looked at) but consistent processing of alternative model information (as one piece of information is considered for each camera: the optical zoom score is looked at for models C, T and D); (3) the pattern of processing, whether by alternative (several attributes of a particular option are considered before another alternative is examined) or by attribute (values of several alternatives on a single attribute are processed before information on another attribute is examined). For example, Mr. Jones might examine the resolution score of each of the three cameras, concluding that model T has the most megapixels and model C the least, as such showing attribute-based processing. The other way round, Mr. Jones could process in an alternative-based fashion by examining the price, resolution, optical zoom, camera size and auto focus of model C in order to form an overall impression of that camera; and (4) whether the strategy is compensatory, meaning that a good value on one attribute can compensate for a poor value on another, as such requiring explicit trade-offs among attributes, or noncompensatory, implying that a good value on one attribute cannot make up for a poor value on another. In case of a noncompensatory strategy, if Mr. Jones decides not to buy a medium-sized camera, then model D will not be chosen regardless of the interesting ratings it may have on price, resolution, optical zoom or auto focus. In case of a compensatory strategy, Mr. Jones may be willing to consider the medium-sized camera if

compensated by a high enough number of pixels, as such requiring an explicit trade-off between camera size and resolution. Bettman et al. (1998) presents an overview of consumer decision strategies and their properties, two of which will be detailed next.

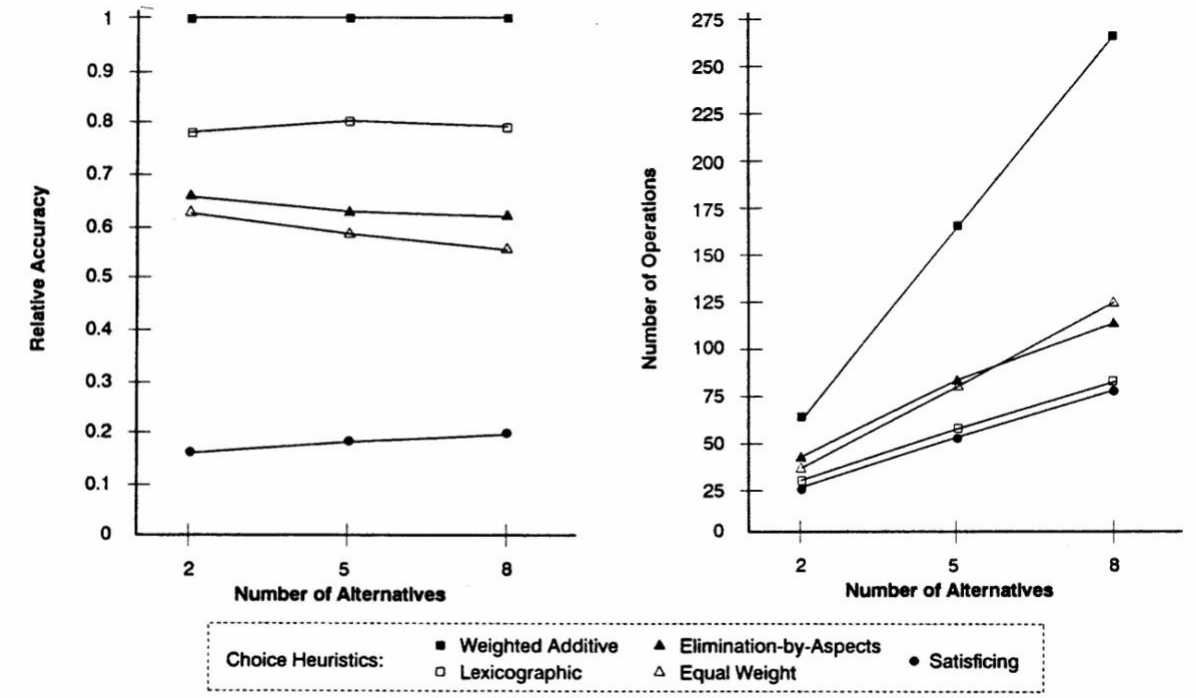
The "weighted adding strategy" (WAD) assumes that the consumer assesses the importance of each attribute and assigns a subjective value to each possible attribute level. This strategy then consists of considering one alternative at a time, examining each of the attributes for that option, multiplying each attribute's subjective value times its importance weight, and summing these products across all of the attributes to obtain an overall value for each option. These overall values will subsequently be compared and the alternative with the highest value will be chosen. This same procedure is used to compute the attitudinal component of Fishbein's behavioral intention model (Fishbein and Ajzen 1975; Miniard and Cohen 1983). In terms of the four aspects differentiating decision strategies as detailed above, weighted adding is characterized by extensive, consistent (not selective), alternative-based, and compensatory processing. Because of these characteristics weighted adding is often considered to be more normatively accurate than heuristics that do not possess these characteristics (Frisch and Clemen 1994). Weighted adding, however, places greater demands on consumers' working memory and computational capabilities. "Elimination-by-aspects" (EBA) eliminates options that do not meet a minimum cutoff value for the most important attribute. This elimination process is repeated for the second most important attribute, with processing continuing until a single option remains (Tversky 1972). This more heuristic strategy is attribute-based, noncompensatory, and often characterized by less extensive and more selective processing. The decision maker's limited working memory effectively requires such selective attention to information.

II.1.2. A COST-BENEFIT FRAMEWORK

A major early empirical finding of decision research was that the same individual will use diverse strategies to make a judgment or choice (Abelson and Levi 1985). People seem to have a repertoire or toolkit of strategies, and these strategies will be used in a contingent fashion, depending upon the properties of the situation (e.g., simplifying heuristics are more likely for more complex, difficult problems such as more alternatives in the set; Payne 1982). A framework that seemed particularly suited to explain this contingent information processing was the cost-benefit approach, with "cost" primarily referring to the effort required to use a rule and "benefit" to the ability of a strategy to select the best alternative (Beach and Mitchell 1978; Russo and Dosher 1983); this approach introduced an effort goal in addition to an accuracy goal, in line with Simon's bounded rationality notion. Furthermore, because the required effort and the resulting accuracy of various strategies vary across different problems, the cost-benefit perspective seemed very well capable to explain why decision strategies vary across situations (Payne, Bettman, and Johnson 1988). Monte-Carlo simulations were run computing the required effort and the obtained accuracy of different strategies in various decision environments. With respect to effort, decision strategies were decomposed into elementary information processes, such as reading a piece of information, weighting information, multiplying or adding values, and comparing two values in line with Newell and Simon's (1972) information processing theory of problem solving. A weighted adding strategy, for example, applied to the choice matrix shown in figure 1 (focusing solely on the attributes resolution and optical zoom) would be decomposed into (Payne, Bettman, and Johnson 1993, chapter 3): reading the weight of the resolution attribute, reading the resolution value of model C, multiply these two numbers and retain the score. The same would be done for the optical zoom attribute, that is read the weight and the optical zoom values, multiply these two numbers and retain the score. The two scores computed this way would then be added and kept as the cur-

rent best alternative. For models T and D the same operations would be applied. The final choice is then based on comparing the final scores for each of the three options. Thus, in total we have 12 reads, six multiplications, three adds and two comparisons. Accuracy was measured by comparing to the normative choice based on WAD. The outcome of a simulation exercise is presented in figure 3, showing for five different strategies how their required effort and obtained accuracy change for an increase in the number of alternatives in the choice set. Payne et al. (1993, chapter 4) concluded that the accuracy of the heuristics is fairly robust as the number of alternatives increases, and that the effort required for heuristics grows less rapidly than that required for a normative procedure like weighted adding. Thus, heuristics seem relatively more efficient as the number of alternatives increases.

Figure 3: The effects of number of alternatives on the relative accuracy and number of operations of choice heuristics



Source: Payne, John W., Eric J. Johnson, James R. Bettman, and Eloise Coupey (1990), "Understanding Contingent Choice: A Computer Simulation Approach," *IEEE Transactions on Systems, Man, and Cybernetics*, 20 (2), 303.

Actual processing data were collected using participants' verbal protocols (Gertzen 1992) and information acquisition patterns (using mouselab[1]; Payne et al. 1988) to verify whether the strategy applied by the decision maker in a particular situation corresponded to the one suggested by the simulation on the basis of the effort-accuracy framework. The framework received strong empirical support. The major findings of these formal modeling exercises and some of the early empirical studies can be classified into two groups: (1) consumer choice research on "problem difficulty" and (2) research on "response mode".

PROBLEM DIFFICULTY

Research on problem difficulty covers a whole range of issues, such as problem size, time pressure, information format, attribute correlation, completeness of information, and comparable versus noncomparable choices (Bettman et al. 1998); the first three will be focused on below.

PROBLEM DIFFICULTY - PROBLEM SIZE

Problem size is characterized by the number of options in the set and the number of attributes across which they vary. Payne (1976) found that, when faced with a large number of alternatives (six or 12), decision makers first use less cognitively demanding decision strategies to eliminate unacceptable alternatives until only a few alternatives are left as candidates

[1] Mouselab (www.mouselabweb.org) is a program that presents participants with a matrix on a computer screen, where the alternatives under consideration are typically the columns of the matrix, and the different attributes of choice are the rows. The actual information is hidden from view (i.e., the cells of the matrix are blank), and the decision maker must *actively* decide to learn any specific piece of information by clicking on a particular cell of the matrix with a mouse. Every action the decision maker takes is recorded by the computer, so that at the end there is a complete record of what the decision maker accessed, how long every piece of information was considered, and the order in which every piece of information was examined (Carroll and Johnson 1990).

for choice. Subsequently, decision makers use more cognitively demanding strategies to choose between the remaining alternatives. Thus consumers use a noncompensatory strategy (e.g., EBA) in an initial phase to eliminate some alternatives, and a compensatory one (e.g., WAD) in a second phase to analyze the survivors in more detail. Payne's (1976) view of a phased decision process has found support from many other behavioral researchers in psychology and marketing (e.g., Bettman and Park 1980; Corbin 1980; Lopes 1995; Lussier and Olshavsky 1979; Olshavsky 1979; Payne and Braunstein 1978; Svenson 1979; Wright and Barbour 1977).

Phased processing implies that consumers react to problem size (defined by number of options) by being selective. Payne (1976) found that the percentage of information searched declined as the number of alternatives available in a decision situation increased. When the participants were asked to choose between just two alternatives, they always searched the same amount of information on each alternative. In multialternative choice situations (six or 12 alternatives), a greater number of dimensions of information was examined for some alternatives than for others in the same set of choice alternatives. In addition, the amount of available information searched was as great or greater for the alternative chosen than for any other alternative in the choice set. Studies by Olshavsky (1979) and Lussier and Olshavsky (1979) showed identical results. Johnson and Russo (1981, 1984) also showed that there is much more complete memory of the attributes of chosen alternatives as compared to rejected ones.

With regard to the other problem size factor, the number of attributes, no change in choice rule was found for an increase in the number of features. Instead the available information was weighted differentially to further simplify the choice task, even to the extent that several attributes were completely excluded from the process (Lussier and Olshavsky 1979; Olshavsky 1979; Payne 1976).

PROBLEM DIFFICULTY - TIME PRESSURE

Payne et al. (1988) conducted research on time pressure and suggested that there may be a hierarchy of responses to time constraints: "People may first attempt to simply accelerate their processing and try to do the same things faster. If the time pressure is too great for acceleration to suffice, individuals may next engage in filtration, focusing on a subset of the available information. Finally, people may change strategies when time pressures become extreme." Particularly interesting was the finding that under more severe time constraints several attribute-based heuristics such as elimination-by-aspects were more accurate than a normative procedure such as weighted adding, because the latter had to be truncated when it ran out of time. Thus quickly examining at least some information on each option seemed more effective than examining a limited set of options in depth (Bettman et al. 1998).

PROBLEM DIFFICULTY - INFORMATION PRESENTATION FORMAT

The way information is displayed affects the processing strategy used. If information is displayed about alternatives sequentially, the decision maker has little choice but to engage in alternative-based decision strategies, while simultaneous presentation of information about several alternatives makes attribute-based search possible (Tversky 1969). Tversky argues that processing by attribute is easier because alternatives can be compared using the same units (since the same attribute is used). Evaluating each of two alternatives one at a time and comparing the two evaluations (processing by brand) is thus more difficult than developing a relative evaluation of the two alternatives on each attribute and eventually combining these relative evaluations over attributes, since the latter requires only half as many between attribute comparisons. In this context, Slovic (1972) suggested a "concreteness principle": decision makers will tend to use only that information that is explicitly displayed and will use it in the form it is displayed, without transforming it. Such behavior would reduce the cognitive effort

required to process the information. This principle is supported by Bettman and Kakkar's (1979) findings that individuals indeed acquired information in a manner consistent with the form of the display (by attribute or by brand). For example, with a display that encouraged alternative-based processing (i.e., booklets were prepared, one for each brand, showing the brand name on the front cover and containing further attribute information inside on different cards. These booklets were arranged on a long table so that the participant could walk back and forth in examining them, similar to the typical supermarket display) more alternative-based processing was observed when examining the sequences of information cards acquired. Likewise, during an election campaign, watching a rally or speech or party convention for a single candidate provides primarily alternative-based information; a political debate, on the other hand, provides largely attribute-based information. The way of processing will follow the presentation formats (Rahn, Aldrich, and Borgida 1994).

RESPONSE MODE

One of the main propositions of rational choice, as indicated at the outset of this theoretical part, is that of "procedure invariance": strategically equivalent ways of eliciting a preference should reveal the same preference (Tversky et al. 1988). This principle does not seem to hold empirically, though. For example, a study by Mowen and Gentry (1980) shows that preferences between two new product projects could be reversed depending on whether the decision maker was asked to choose one of the projects (i.e., pick the most preferred option) or designate a price for the rights to each project (i.e., provide an overall evaluation of each alternative). The leading explanations for the observed preference reversals have to do with processing differences associated with the different response modes. The need to evaluate alternatives would lead to alternative-based searching and more quantitative thinking, while choosing among alternatives would lead to more attribute-based searching and more qualita-

tive thinking (Fischer and Hawkins 1993; Lichtenstein and Slovic 1971; Tversky 1969; Tversky et al. 1988).

II.1.2.B Choice Based on Reasons

Next to the cost-benefit framework detailed above, the desire to explain one's decision (to oneself or to others) may be drawn upon to clarify the construction of preferences and choice. As noted by Shafir, Simonson and Tversky (1993) in their article on reason-based choice: "Consumer decisions are often evaluated, either by others to whom one is accountable or by oneself. Hence, consumers often must be able to justify or to provide reasons for a decision." Tversky and Shafir (1992), for example, ask participants to assume they just took a though qualifying exam. One group is told they passed, another group is told they failed, and a third group is told they will learn the results tomorrow. Each group is offered a choice among buying a vacation to Hawaii on sale today only, not buying the vacation, or paying $5 to retain the right to buy the vacation package tomorrow. The majority of those who think they passed or failed the exam select the vacation, but the majority of those who don't know the results want to retain the right to buy the vacation tomorrow, probably because they have no reason to purchase the package today.

Such reason-based choice seems particularly suited for choice problems that are more perceptual in nature, meaning a limited number of options and attributes presented in simple tables of numerical ratings (Bettman et al. 1998). A phenomenon that perfectly fits this description is the asymmetric dominance effect (Huber, Payne, and Puto 1982; Huber and Puto 1983), showing only two or three options and two attributes in a matrix format. For such sets it is possible to make comparisons in a simple, perceptual fashion, taking in the options "at a glance". For example, the fact that camera model T dominates model D (figure 1) is then a good reason for choosing model T (it is clearly a better outcome than model D in terms of its

scores on resolution and optical zoom[2]; see the part on the definition of context effects for a more detailed description of the asymmetric dominance effect), and there is no need for a more complex explanation such as "I chose model T over C on the basis of trade-offs I had to make between the cameras' resolution and optical zoom scores." In line with this, Shafir et al. (1993) argued that relationships among options may be perceived to be more compelling reasons or arguments for choice than deriving overall values for each option and choosing the option with the best value. Reason-based choice driving the asymmetric dominance effect also seems to be supported by Simonson's (1989) studies showing an increase in the effect if participants were told before the choice phase that they would have to justify their decision afterwards.

These so-called "relational heuristics", however, pose serious threats to traditional choice theory (Luce 1959) and to modeling applications based on this theory. Changes in the set of options under consideration change the relationships among the options and therefore some of the potential reasons for choosing among the options. As such, changes in the decision context can alter the reasons that are salient and thus the choice made (Bettman et al. 1998). The above mentioned asymmetric dominance effect is a perfect example of such context-dependent preferences based on the relationships among the options. This however implies that the classic assumption of "independence of irrelevant alternatives" no longer holds. More particularly, the "principle of proportionality" (i.e., if a new option is added to a choice set, the shares of the existing options will decrease in direct proportion to the size of the original shares) and that of "regularity" (i.e., the addition of a new alternative cannot increase the probability of choosing a member of the original set) are violated by the finding that the addition of an asymmetrically dominated option to the choice set increases the choice share of the

[2] We do not focus on the camera size attribute yet. This attribute will play a role later on in the unacceptability manipulation.

dominating alternative (e.g., the addition of camera model D to the two-option set increases the choice share of camera model T relative to that of model C; Huber et al. 1982).

A phenomenon that recently has been defined as the attribute-balance effect (Chernev 2004, 2005) also fits within this reason-based decision making approach. Chernev (2005) gives the following example: "Consider a scenario in which choice alternatives are described by attributes using readily comparable metrics, say 100-point rating scales. In this scenario consumers are likely to compare not only the options' values across different attributes but also attribute values within each of the options. As a result, an option with balanced attribute values (60, 60) tends to be perceived as less extreme than an option with values (70, 50), making the balanced-option the likely choice outcome." This effect is not depending upon the relational properties of the choice alternatives in the set (as is the case for the asymmetric dominance effect), but is derived from the option-specific dispersion of attribute values. Thus, the attribute-balance effect is relatively independent of the relative advantage of the options in the set because they are defined by an option's internal properties rather than relative to the other choice alternatives (Chernev 2005). The attribute-balance effect and the relational heuristics share certain similarities though, formulated by Chernev (2005) as follows: "both effects assume the presence of preference uncertainty, whereby the decision maker has difficulty determining preference based on attribute weights and values alone, and both effects are a function of the dispersion of the attribute values describing choice alternatives rather than a function of individuals' prior experience with the product."

II.1.2.C Choice Based on Minimizing Negative Emotion

A third and final factor in constructive preferences is that of minimizing the negative emotion that consumers experience when dealing with more difficult trade-offs or choices with severe consequences, for example, a parent trading off between his or her family's safety

and the price when purchasing a car (Luce 1998). Increased trade-off difficulty leads to increased processing that is more attribute-based due to avoidance of trade-offs (i.e., attribute-based processing minimizes confronting the possibility that one attribute must be sacrificed to gain on another, whereas alternative-based processing highlights such trade-offs; Luce, Bettman, and Payne 1997), more avoidance of choice such as increased choice of an asymmetrically dominating alternative or a greater tendency to prolong search (Luce 1998), and less willingness to trade quality for price (Luce, Payne, and Bettman 1999).

The goals of maximizing accuracy, minimizing effort, maximizing the ease of justification and minimizing the experience of negative emotion together constitute the "choice goals framework" (Bettman et al. 1998) that provides a theoretical foundation for the constructed choice processes model and opposes many of the notions underlying the classical rational choice model. Whereas the choice goals framework and effort-accuracy trade-offs in particular involve a more controlled and cognitive approach to decision making (Lynch 2005), the literature has more recently put more emphasis on the nonconscious aspects of decision making. More generally, although recent major surveys of consumer research (Cohen and Chakravarti 1990; Jacoby, Johar, and Morrin 1998; Simonson et al. 2001) still report that the major emphasis is on purchase decisions, with a dominant cognitive approach to understanding how they are made, Bargh (2002) warns that "to the extent that consumers are behaving without conscious awareness and guidance, models that assume the consumer's deliberate and effortful scrutiny of the choice or behavior will likely miss much of the character and flavor of consumer behavior in situ."

II.1.3 THE NONCONSCIOUS DECISION MAKER

Increasingly, research has shown that a large part of consumer decision making occurs outside of conscious awareness or is influenced by factors unrecognized by the decision maker (Fitzsimons et al. 2002). Some examples are given below that illustrate such nonconscious decision making.

II.1.3.A SOME EXAMPLES OF NONCONSCIOUS DECISION MAKING

Sen and Johnson (1997*)* found that the possession of a rebate coupon (i.e., a $15 gift certificate to one of the local area restaurants) prior to restaurant choice (i.e., choice between three restaurants scored on the attributes food quality, and service and atmosphere) enhanced consumers' preference for the couponed restaurant. In addition, these mere possession effects were stronger for meaningful tasks (operationalized by way of expertise and liking for the category, using three seven-point Likert items) where consumers were likely to exhibit more care in considering information. This reinforcement (instead of the expected reduction) of the bias was interpreted as the effect being due to an underlying automatic process. To minimize any potential demand effects resulting from participants' inferences regarding the relative desirability of the couponed option, they were asked to pick one of three sealed but unmarked envelopes. While participants were told that each envelope contained a different gift certificate, all envelopes contained the same coupon. Finally, to reduce the potential transparency of the task, similar "filler" tasks were used involving attributes such as dress code, distance and safety.

The study by Fitzsimons and Shiv (2001) showed that when consumers responded to hypothetical questions (viz. normatively irrelevant questions), the content of the question had a substantial impact on subsequent actual behavior despite the fact respondents were clearly

aware the question was pure hypothetical. In a first study they investigated voting behavior presenting a choice between two political candidates running for office in Kansas. Before being asked to vote, participants from the hypothetical-question condition read the following question: "If you learned that candidate A had been convicted of fraud in 1988 on a charge stemming from several illegal donations accepted and subsequently misrepresented during his successful campaign for state treasurer, would your opinion of him increase or decrease?" Participants registered their response using a slide bar with end points "become more negative" versus "become more positive" and a midpoint labeled "wouldn't change", scaled from 1 to 99. When compared to the no-information condition, the choice of candidate A was lower in the hypothetical-question condition. A second study involved an actual choice between a piece of chocolate cake with cherry topping and a serving of fruit salad, with this choice being perceived by participants as external to the experiment. More concrete, the experiment was carried out in two different rooms. In the first room, participants were provided with instructions stating that they would be taking part in two different studies being carried out by various members of the staff. They were told that the first study would be conducted in the first room and the second study, which served only as a filler task, would be conducted partly in the first room and partly in the second room. The disguise used was that the second study was about the effects of a change in environment on how consumers express opinions about products. Further, participants were told that they would be provided with a choice of snacks for participating in the study while walking from the first to the second room. A hypothetical question was presented in the first study and focused on the health benefits associated with the consumption of cake: "If strong evidence emerges from scientific studies suggesting that cakes, pastries, etc. are not nearly as bad for your health as they have often been portrayed to be, and may have some major health benefits, what would happen to your consumption of these items?" Compared to the control group, where respondents had not been asked a hypo-

thetical question, an increase in the percentage of participants choosing the cake was found for the group being exposed to the hypothetical question. Interestingly, these contaminative effects of the hypothetical question increased for an increase in cognitive elaboration (manipulated by asking participants to justify their behavior), suggesting a nonconscious mechanism (this holds for both the voting and the snack experiment). In addition, a funnel debriefing task applied to the snack study supported this nonconscious view. With respect to the issue of whether participants believed the hypothetical question affected their subsequent choice, participants were asked whether they felt the first study affected their choice. Every participant responded negatively. When they were specifically asked "What if I told you that your choice was probably influenced by what you did on the first study, what would you say?", there was disbelief, with most participants unwilling to accept the possibility of influence.

In another example, Mandel and Johnson (2002) found that priming product attributes on a web page via background pictures and colors affects product choice, without conscious awareness of this effect. In particular, when primed on money using a green welcome page with dollars, participants were more likely to choose the cheaper, lower quality product, than when primed on the quality feature (i.e., safety for the car example, using a red and orange welcome page with flames; comfort for the sofa example, using a blue background with clouds). Mandel and Johnson note that their priming manipulation was not subliminal. All of their participants could plainly see the background on the first page, and many recalled the wallpaper. An important question was whether or not the participants were aware of the prime's effect. When asked, most participants did not think that the wallpaper influenced their choice.

Janiszewski (1990, 1993) showed how the allocation of subconscious resources to brand names during the processing of ads can influence their evaluation. He concludes that mere

exposure to a brand name or product package can encourage a consumer to have a more favorable attitude toward the brand, even when the consumer cannot recollect the initial exposure.

Finally, a study by Shapiro, Macinnis and Heckler (1997) extends this research on incidental ad exposure by examining whether incidental exposure to an ad (i.e., the ad receives minimal attentional resources while other more relevant information is being processed) increases the likelihood that a product depicted in the ad will be included in a consideration set. Inclusion-effects were found despite participants' lack of explicit memory for the ads.

II.1.3.B Chartrand's Model of Automatic Processes with a Reference to Context Effects

The above examples of nonconscious influences in choice fit within a more general framework, the "model of automatic processes" proposed by Chartrand (2005). This model contains three phases, each of which may be experienced in a conscious or nonconscious way. First, there are the environmental features that trigger an automatic process; second, the process itself; and third, there is the outcome. The importance of identifying each of these three stages and whether consumers are aware of them or not lies in the fact that control, modification, elimination and change can only come with awareness, and each stage requires its own mechanism for change. Chartrand (2005) argues that in the consumer behavior domain, where the outcome is often a choice between product options, the decision maker is most often aware of the outcome—that is, of what he or she chose. However, the consumer may not be consiously noting the environmental feature that triggers this outcome (e.g., the background music in the store). One of the most frequent scenarios in consumer settings would be one in which the consumer is aware of the environmental trigger and the outcome, but not the automatic process. People's self-insight tends to be limited and their introspective ability flawed

(Nisbett and Wilson 1977). The several studies described above are examples of both nonconscious processes (i.e., Fitzsimons and Shiv 2001; Mandel and Johnson 2002; Sen and Johnson 1997) and nonconsciously perceived environmental features (i.e., Janiszewski 1990, 1993; Shapiro et al. 1997).

Research on context effects, previously discussed in terms of its role in activating the ease of justification goal, can also be placed within this model of automatic processes. First we focus on the automatic process phase, next on the environmental features phase. Simonson (1989) has shown that the asymmetric dominance effect becomes stronger when respondents are required to justify their results. Fitzsimons et al. (2002) interpret this finding as asymmetric dominance running through a nonconscious process, arguing that had the bias been conscious, it would have been expected to moderate under the high processing condition. Shafir, Waite and Smith (2002) show that asymmetric dominance effects can be obtained with honeybees and gray jays; these results are also consistent with the idea that asymmetric dominance effects may be more automatic and do not require higher-order cognition for their occurence. An increase in the asymmetric dominance effect was also found by Dhar and Simonson (2003) after making available a no-choice option (i.e., the option not to select any alternative at all in a choice setting) as a way to solve choice conflict (caused by uncertainty about the options' attribute values and consumers' preferences for those values, especially if the options are similar in terms of overall attractiveness). Simonson (2005) argues that consumers fail to recognize the impact of the inferior option on their preferences. He states that "the asymmetric dominance effect appears to be driven by a rather detailed processing of the options' values and the set configuration, even though consumers tend to misattribute their choices to tastes, and thus are not aware of the impact of the inferior choice option."

The study by Dhar and Simonson (2003) shows a different picture for the compromise effect, another type of relational heuristic (this latter effect is traditionally defined as an increase in the relative choice share of an alternative as it becomes a middle option in the set, meaning that its attribute values lie between those of the other alternatives in the set. Suppose digital photo camera model T had a score of 5.3 pixels on the resolution attribute, then the addition of model D to the set would make model T an intermediate option, causing an increase in its choice share relative to that of model C; Simonson 1989). Making a no-choice option available decreases the compromise effect. Thus, although asymmetric dominance and compromise are both relational heuristics that depend upon relationships among the available options, research suggests that these two heuristics may fundamentally differ in the processing that characterizes each. In particular, asymmetric dominance may be more automatic and perceptual in nature, whereas compromise may be more controlled and cognitive (Dhar and Simonson 2003). This differential view could perhaps be tested using fMRI (i.e., functional magnetic resonance imaging), one of the methods used within the emerging area of decision neuroscience. The regions of the brain active during asymmetric dominance choices and compromise choices should differ systematically (Kerns et al. 2004; Shiv et al. 2005). In particular, as compromise effects will be characterized by more controlled processing, in particular conflict resolution and cognitive control, more activation of the anterior cingulate cortex, insula, prefrontal cortex, and orbito-frontal cortex is expected for compromise choices relative to asymmetric dominance choices. There may be more amygdala activation for asymmetric dominance choices relative to compromise choices.

Dijksterhuis and Smith (2005) take the idea of the asymmetric dominance effect being driven by a nonconscious process after a detailed processing of the options values and the set configuration even one step further. They argue that conscious awareness of the inferior option is not even necessary for the context effect to occur. For this, they draw upon an abun-

dance of social psychological research showing judgmental contrast effects: we find people less aggressive after comparing them with Hitler (Herr 1986), or we find ourselves less intelligent after being primed with Einstein (Dijksterhuis et al. 1998). In addition, these effects occur even when the comparison stimulus is primed subliminally (Stapel and Blanton 2004).

As mentioned before, the decision maker is assumed to be aware of the outcome most of the time. Bargh et al. (2001), however, show a different picture. Participants were primed or not with the goal to be cooperative by using a variation of the scrambled sentence test, including words such as dependable, helpful, support, reasonable, honest, cooperative, fair, friendly, tolerant, and share in the cooperative condition; and words such as salad, umbrella, city, gasoline, wet, purposeful, switch, lead, mountain, and zebra in the control condition. Although participants primed with the goal to be cooperative indeed were more cooperative in a resource-dilemma task (i.e., a game where participants were asked to fish from a lake with a limited number of fish, and had to decide whether they would keep the fish for personal profit or would return the fish to the lake to help restock it), they did not report being any more cooperative than unprimed participants, and their self-reports were uncorrelated with their actual behavior. The same was found by Johnston (2002) in a consumer setting: seeing someone eat a large quantity of ice cream leads individuals to eat more ice cream themselves. Although these people are clearly aware that they are eating ice cream, it has been shown that they are not aware of the greater quantity they eat. Thus, even if the average person is normally aware of what he or she is doing in a broad sense, the person may still lack meta-awareness of the behavioral details (possibly because people do not closely monitor their actions) (Chartrand 2005; Dijksterhuis and Smith 2005).

II.1.3.C More Extreme Views on the Nonconscious Decision Maker

Although certain researchers believe that many (choice) processes must have both nonconscious and conscious components (e.g., Chartrand 2005; Fitzsimons et al. 2002; Simonson 2005), others hold a more extreme opinion: "Everything that one encounters is preconsciously screened and classified as either good or bad, within a fraction of a second after encountering it" (Bargh 1997); "The role of consciousness should not be exaggerated. Rather than actually guiding or controlling behavior, consciousness seems mainly to make sense of behavior after it is executed" (Loewenstein 2001); and "Conscious processes and consciously considered inputs play a relatively minor role in many, perhaps most, judgments, choices and behaviors" (Dijksterhuis 2005). Dijksterhuis (2004) even refers to a quote of Freud: "Use consciousness for relatively simple and mundane decisions, but refrain from using it too much for more complex matters." This latter notion has been tested by way of an experiment (Dijksterhuis 2004). Participants were asked to make a choice between four apartments, where one apartment was the most attractive with eight positive, four negative and three neutral attributes, while the three remaining apartments were equally attractive and characterized by five positive, six negative and four neutral attributes. The percentages of participants choosing the attractive apartment were compared for a conscious thought condition (i.e., after being confronted with the apartments, participants were asked to very carefully think about what they thought about each of the apartments and were given 3 min. to decide, sitting in front of a blank computer screen) and a nonconscious thought condition (i.e., participants were distracted during the 3 min. time period by having to decide for successive digits presented on the screen whether they matched the digit that preceded it by two places. This enabled them to think unconsciously while at the same time preventing conscious thought). Choice of the attractive apartment turned out to be higher for the nonconscious group. On the basis of these findings Dijksterhuis concluded that unconscious thought improves the quality of more com-

plex decisions. In addition, he argued that this difference in quality was due to conscious thought taking only a limited set of the available information into account whereas the unconscious included all (or almost all) information. The selectivity in case of conscious thought would be in line with Simon's (1955) bounded rationality idea. The unconscious however would have unlimited resources. An analysis of the number of bits both systems can process was given by Dijksterhuis to illustrate this point: consciousness can process 40 to 60 bits per second (Nørretranders 1998; Wilson 2002), whereas the capacity of the entire human system is about 11,200,000 bits. It has to be noted that, although provocative, Dijksterhuis' results may depend upon the very specific properties of the stimuli and task used, and that his conclusions may not generalize to other choice situations.

In sum, this look at the decision making literature has examined the rational decision maker, the decision maker with bounded rationality, the adaptive or constructive decision maker, and finally a more unconscious one. The parts that follow draw upon several of the ideas, concepts and findings that were described above. More particularly, the concepts of bounded rationality, phased decision making and selectivity lead to a first proposition regarding the unacceptable option's role in the further decision process. A second view is then based on the idea of context-dependent preferences, as discussed in the part on reason-based choice, and introduces the notion of a nonconscious underlying process. We then note that differential processing may characterize the two context effects of asymmetric dominance and compromise (i.e., automatic and perceptual versus controlled and cognitive), as detailed in Chartrand's model of automatic processes. These arguments imply that the unacceptable option's role is contingent on how it adds to the final choice context. Furthermore, specific studies such as those by Chernev (2004, 2005), Sen and Johnson (1997) and Fitzsimons and Shiv (2001) will be useful in the operationalization stage of the dissertation's research. Before looking at this research, we will give detailed definitions of truly unacceptable options and

context effects, show how they might be integrated, and subsequently formulate opposing hypotheses regarding the unacceptable option's role in the further decision process.

II.2 Definition of Unacceptable Options

Our definition of a "truly unacceptable option" is based on Park's (1978, 125; 1982, 154) classification of product dimensions. An unacceptable option is an alternative not satisfying a minimum acceptable threshold on a rejection inducing dimension (RID), such that the option would be rejected by the decision maker regardless of its other features (e.g., a medium-sized camera will not be bought, even if it has, for example, a high resolution). In addition to rejection inducing dimensions, Park also defines trade-off, relative preference and irrelevant dimensions, each time decreasing the degree of unacceptability. An alternative characterized by the absence of a satisfactory level on a trade-off dimension will be acceptable only if it shows an off-setting improvement on another feature (e.g., a camera priced above $350 will be unacceptable, unless its bad score on the price dimension is compensated for by another important feature such as high resolution). For a relative preference dimension, the alternative is acceptable to the decision maker, but the degree of preference is influenced by the differential threshold of desire defined by the decision maker on this dimension (e.g., good if the camera is a Panasonic, and excellent if the camera's brand is Kodak). Finally, in case of an irrelevant dimension, the decision maker is indifferent to the characteristics on the product dimension (e.g., the decision maker is indifferent to whether the camera has manual focus or not).

The rejection inducing dimension is introduced in Park's (1978) research in his phased decision model, "the conflict resolution choice model." This model contains an initial conditional elimination phase, reducing the presented alternatives to a smaller set of acceptable brands, and a subsequent satisficing-plus phase, leading to the selection of a single brand from

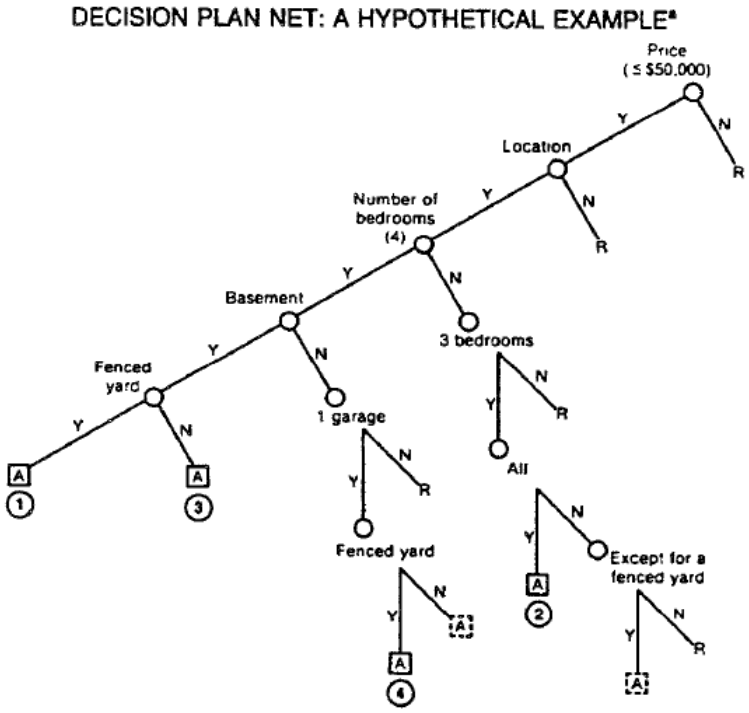
this acceptable set. It was shown that this model outperforms in terms of choice prediction single phase models such as the weighted adding model or the lexicographic semi-order model. In discussing the conflict resolution choice model, Park makes an interesting distinction between continuous (e.g., price and gas mileage) and noncontinuous (e.g., two-door versus four-door; family versus sports car) product dimensions, thereby suggesting that consumers' rejection rules based on noncontinuous dimensions are more stable. More particularly he states the following: "The importance of characterizing a stimulus as continuous or noncontinuous lies in the fact that for many noncontinuous variables an individual can reliably categorize an object as belonging to a class of objects (e.g., two-door cars). An objective external standard of reference is often present in the case of noncontinuous product dimensions which allows the individual to discriminate between categories more clearly. This may not be true in the case of continuous product dimensions. A relatively high degree of stimulus ambiguity is expected in the cognitive categorization of continuous product dimensions, since an objective standard of reference is often not available. Therefore, categorization on these product dimensions is not as straightforward as for noncontinuous product dimensions. This does not mean that the continuous product dimension is not cognitively categorized (e.g., gas mileage could be categorized by breaking it into ranges; unacceptable if below 15, acceptable if between 15 and 20, excellent if above 20). However, this categorization may be unstable; it may change during the choice process."

Illustrations of how categorization may change during the choice process go in two directions. First, individuals may readjust the cognitive categories of price or gas mileage to facilitate a final choice when the alternatives are not satisfactorily distinguishable based upon the initial categories of the continuous product dimensions and information about the other product dimensions. The study shows that nine participants (of 58) distinguished the first choice from the second based solely upon price differences that they viewed initially as be-

longing to the same categories. In addition, four participants made a final choice based solely upon gas mileage differences initially viewed as belonging to the same categories. Second, and perhaps more interesting, individuals may include in their evoked set alternatives initially marked as containing truly unacceptable levels, and this trend may be larger for continuous compared to noncontinuous attributes. Park reports that 22 participants (of 58) included in their evoked set at least one brand for which the dimensions were below minimum levels on the RIDs. Fifteen of these 22 participants included in their evoked set brands which possessed unacceptable scores on the continuous product dimensions price and gas mileage. For example, if the participant indicated "gas mileage $\geq$ 25" as a minimum cutoff level, a brand with 23 mpg. should certainly be rejected. However, this brand might have been included in the evoked set if information on the other product dimensions could compensate for the "unacceptable" 23 mpg. Seven participants included in their evoked set brands which possessed unacceptable categories on noncontinuous product dimensions.

Park also included the rejection inducing dimension in his development of a "decision plan net" (defined by Park et al. (1981) as "a decision maker's detailed sketch about intended strategies toward future decision situations"; figure 4 shows a concrete example of a decision plan net for a person who wants to buy a house). Park applied the decision plan net both to individual buying behavior to verify whether the outcome of the decision plan was in line with the actual choice made (Park et al. 1981) and also to family decision making (Park 1982).

Figure 4: An example of a decision plan net



[a]The five home features (choice criteria) listed down the left side, if present ("Y"), render a home acceptable ("A") for consideration. A right branch indicates a home without a satisfactory level on the feature ("N"). For example, the right branch from the price node indicates a home costing more than $50,000. The "R" means that such a home will be rejected from further consideration. The right branch from the third node indicates a home with only three bedrooms (assuming satisfactory features on the first two nodes). It is acceptable if satisfactory on *all of the remaining features* ("all"). A three-bedroom home without a fenced yard is also acceptable if it has a basement ("except a fenced yard"). Numbers under some "A's" refer to preference rankings among acceptable alternatives.

Source: Park, C. Whan (1982), "Joint Decisions in Home Purchasing: A Muddling-Through Process," *Journal of Consumer Research*, 9 (September), 153.

A definition of a truly unacceptable option similar to that of Park (1978, 1982) was given by Klein (1987, 155): an attribute level is checked as unacceptable if it is so disliked that "if a product has it, you would immediately reject it as an alternative, no matter what else it has to offer." The strongest of several formulations of an unacceptable level listed by Metha, Moore and Pavia (1992) and by Green, Krieger and Bansal (1988) also coincides with Park's definition of a rejection inducing dimension. These studies all have in common that they look at the unacceptable option in relation to conjoint analysis. The Adaptive Conjoint Analysis' interactive nature allows the respondent to indicate whether any levels within an attribute are

"completely unacceptable" in the sense that no matter how attractive an alternative might be on other attributes, the respondent would reject the alternative if it contained any completely unacceptable attribute level (Green et al. 1988). This has the advantage of being able to confine questions to acceptable levels, as such reducing the number of questions posed, tailoring the interview to the individual, making it more interesting, and allowing for more efficient estimation of the remaining levels (Metha et al. 1992). One has to be cautious, however, as a misspecification of utility models may occur if respondents do not behave in line with these unacceptability judgments. Studies have indeed shown that the first choice of some respondents may contain an unacceptable level of an attribute: "on average, the completely unacceptable level is chosen 14.8% of the time" (Green et al. 1988) and "in 11% of the decisions respondents choose an alternative with an unacceptable level even though there were acceptable alternatives in the choice set" (Klein 1987). To explain this discrepancy between judgment and choice Klein argues that unacceptability is likely to be context-dependent, rather than an inherent characteristic of an attribute level. She wonders how strongly noncompensatory decision strategies reflect judgments made prior to the choice, as opposed to dynamic responses to a particular choice context that is encountered. That choice environment matters is shown in a study by Huber and Klein (1991). They examined the effects of attribute correlation and reliability of the information about the attribute on the severity of cutoffs, and in general found that positive correlations between attributes (compared to negative ones) and more reliable sources caused more severe cutoffs (meaning that fewer attribute levels were acceptable).

In the literature the concepts sacred values (Tetlock 1992; Tetlock, Peterson, and Lerner 1996), protected values (Baron and Spancra 1997), and taboo trade-offs (Tetlock et al. 2000) are used to refer to attributes that resist trade-offs with other attribute levels, thus leading to judgments of unacceptability. Examples include life, justice, liberty, honor, love, nature, and human rights. In the current dissertation we do not restrict the concept of the truly unaccepta-

ble level to that of a sacred or protected value. As mentioned by Luce, Bettman and Payne (2000) the class of attributes with links to moral rules is likely to represent a mere subset of the attributes that decision makers value. Furthermore, Baron and Spancra (1997) state that it should be possible to find nonmoral values that are also protected (in the sense of resisting tradeoffs). Thus, the studies presented hereafter will denote any attribute level, with moral inclination or not, that complies with Park's definition of a rejection inducing dimension as truly unacceptable.

II.3 Definition of Context Effects and Their Integration with Unacceptable Options

The central question addressed by the current dissertation is whether information provided by an unacceptable option plays a role in the decision process by altering the choice context and thus affecting the final choice. As such, the current work draws upon a well-known phenomenon called "context effects on choice", which is defined by Ratneshwar, Shocker and Stewart (1987) as "a change in the choice process or in its results as a function of the particular composition of the choice set." Shafir et al. (2002) add to this that choice does not merely reflect the subjective evaluation of independent attributes of options, but is influenced by the characteristics of the other options that are being compared.

Context effects typically have been studied by comparing people's preferences between two options (a target T and competitor C defined on only two attributes and lying on the same equi-preference contour; figure 5) when presented alone and when presented along with a third alternative (decoy D or D') (Huber et al. 1982; Huber and Puto 1983; Shafir et al. 1993; Simonson 1989; Simonson and Tversky 1992; Tversky and Simonson 1993). The relative preference for the target relative to the competitor is equal to the proportion of choice of T

divided by the sum of the proportion of choice of T and the proportion of choice of C (Shafir et al. 2002).

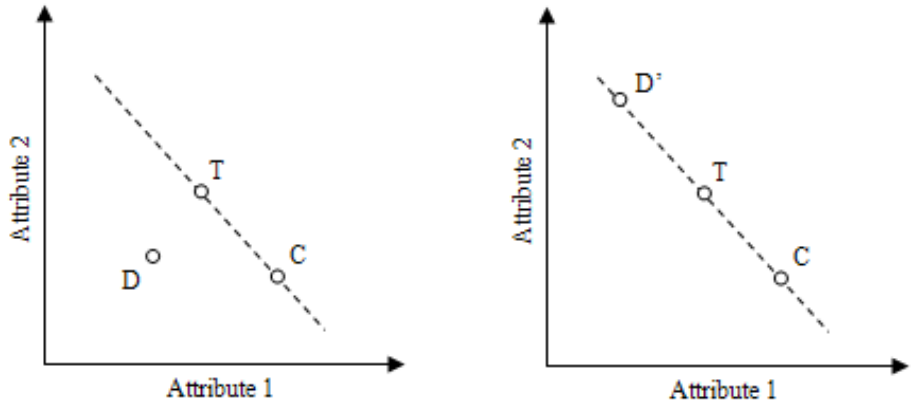
More concretely, we consider the impact of unacceptable options on choice sets where that unacceptable option is either asymmetrically dominated (Huber et al. 1982; Huber and Puto 1983) or is an extreme option in a compromise situation (Simonson and Tversky 1992). For example, we ask whether giving information that an asymmetrically dominated decoy has a fatal flaw decreases or leaves unchanged the context effect. This result is theoretically important, since asymmetric dominance and compromise rely on the relative values in the set, whereas a truly unacceptable feature might exclude an alternative regardless of the other values.

Next, we define the standard context effects of asymmetric dominance and compromise. An asymmetric dominance effect occurs if the choice share of the target relative to the competitor is enhanced when a third option (D), which is asymmetrically dominated, is added to the set. Asymmetrically dominated means that D is dominated by at least one alternative in the set (T) but is not dominated by at least one other (C), with dominated meaning that an option scores worse on at least one attribute and is equivalent or inferior on all other attributes (figure 5; Huber et al. 1982). The asymmetric dominance effect is a robust finding. Although a majority of the demonstrations of this effect have been in the context of consumer decision making, in product classes ranging from cars and restaurants to light bulbs and paper towel (Heath and Chatterjee 1995; Huber et al. 1982; Lehmann and Pan 1994), results from contexts such as job candidate choice (Highhouse 1996), electoral candidate choice (Pan, O'Curry, and Pitts 1995) and gambles (Wedell 1991) also provide evidence of this effect. Even honeybees and gray jays show the asymmetric dominance effect (Shafir et al. 2002). From a methodological point of view, the effect has been tested between-subjects (Huber and Puto 1983; Huber

et al. 1982; Ratneshwar et al. 1987; Simonson 1989; Wedell 1991) as well as within-subjects (Lehmann and Pan 1994; Pan and Lehmann 1993; Wedell 1993), and measured based on choice (Heath et al. 2000) as well as ratings (e.g., an attractiveness rating using a nine-point scale with anchor points: 1 = "not at all attractive", through 9 = "very attractive"; Pettibone and Wedell 2000) and points data (i.e., the division of 100 points among the options based on their relative liking for each one; Sen 1998).

The compromise effect occurs if the relative choice share of the target is enhanced when a third option (D'), which makes the target a compromise option, is added to the set (figure 5). A compromise option is defined here as a middle option, meaning that its attribute values are between the values of the other alternatives (Chernev 2004; Simonson 1989; Simonson and Tversky 1992).

Figure 5: Defining context effects - Asymmetric dominance and compromise



Note. C = competitor; T = target; D = asymmetric dominance decoy; D' = compromise decoy.

As mentioned before, the question we address is whether a decoy (D or D') with a truly unacceptable additional feature produces the same context effects. The option's truly unacceptable feature is defined by adding a third categorical attribute, taking two possible values, present or absent, with one of these values being truly unacceptable. For example, a product

may not have a CE label (Conformité Européene). A product without this label may be unhealthy or dangerous for the environment, and purchasing it would be illegal in the EU. Although consumers' rejection rules based on continuous attributes may change during the choice process, categorical thresholds have been found to be more stable (Park 1978).

Thus, two continuous attributes determine the context relationship among the three options, while the third categorical attribute defines the decoy's unacceptability. This contrast can be seen in the two choice sets in figure 6, the one on the left containing the standard asymmetrically dominated alternative and the one on the right showing the decoy becoming unacceptable because it lacks the CE label. In this way, it is possible to make the decoy an acceptable (CE label: "Yes") versus unacceptable (CE label: "No") option without changing the context relationship present in the set (appendix 2). In addition, making unacceptability independent of the context-defining attributes theoretically makes it possible for decision makers to never notice the context-defining attribute levels if they reject an unacceptable option based on the third categorical attribute.

Figure 6: Illustrating the manipulation of unacceptable levels

Choice without unacceptable attribute			
Choice	Digital photo camera	Storage capacity (megabyte)	Optical zoom
☐	C	96	2X
☐	T	64	3.6X
☐	D	32	2.8X

Choice with unacceptable attribute				
Choice	Digital photo camera	Storage capacity (megabyte)	Optical zoom	CE label (Conformité Européene)
☐	C	96	2X	Yes
☐	T	64	3.6X	Yes
☐	D	32	2.8X	No

Note. C = competitor; T = target; D = asymmetric dominance decoy.

II.4 Arguments Contra versus Pro the Effect of a Truly Unacceptable Option on Subsequent Choice

Arguments can be made to support either no effect of having an unacceptable decoy or that an unacceptable decoy will affect choices. Based upon notions of bounded rationality (Simon 1955), decision makers may resort to phased choice processing when presented with an alternative containing an unacceptable attribute level in order to save effort (Payne 1976). A typical phased strategy would contain an initial phase (i.e., an editing phase) in which some alternatives are eliminated after considering only a small portion of the available information (Bettman et al. 1998; Payne 1976), followed by a choice phase. Thus, if information that an option is unacceptable leads to its immediate elimination in this initial editing phase, that will limit any impact of that alternative (and the information it contains) on the final choice, leading to the following hypothesis:

H1a: A truly unacceptable decoy option (and the information it contains) will have no impact on the subsequent choice phase and final choice of the best option. Thus an unacceptable decoy will nullify standard asymmetric dominance and compromise context effects.

Alternatively, arguments can be made that an unacceptable option may have an effect on choice. Individuals, even if editing out or rejecting an option, may briefly examine the other contributing attribute values for that option in addition to considering the categorical attribute (perhaps out of some sort of curiosity or even nonconsciously). This consideration might pave the way for the unacceptable option to help define the context within which the other options are perceived and therefore preference among alternatives (e.g., Huber et al. 1982; Simonson and Tversky 1992). Thus, the context of the choice set may be partially determined by such

"contaminated" perceptions (Wilson and Brekke 1994, 119[3]) regarding how the unacceptable option's continuous attribute levels define the relationships among the choice options. Such contamination is difficult to detect by the individual; decision makers are often quite good at recognizing the outcome of a process, but they are not nearly as good at determining the various contributors to that outcome (Nisbett and Wilson 1977; Wilson et al. 1989). The fact that the process of contamination is unobservable might not be that bothersome if contamination had observable symptoms, which is unfortunately seldom the case. "Human judgments—even very bad ones—do not smell (Wilson and Brekke 1994)." This difficulty of detecting contamination makes it hard to eliminate, for the simple reason that if people are unaware that their judgment is biased, they will not try to debias it (Wilson and Brekke 1994).

The idea that debiasing might not be that simple is also found in the article by Houghton et al. (1999): "One difficulty in applying debiasing approaches is that consumers typically operate (in real life) in a between-subjects design. Consequently, the decision errors cannot be easily observed by an individual consumer. Furthermore, many of those choice phenomena may operate through perceptual processes that are unconscious." Nisbett and Wilson (1977) also point to the importance of people's *not* being aware of the influence of certain stimuli for some set of psychological phenomena to take place. If people were aware of the effects, they would surely strive to counteract that influence, and would therefore not show the typical effect. They list several examples of such psychological phenomena, two of which are mechanics of judgment (e.g., contrast effects) and certain context effects.

[3] Wilson and Brekke define mental contamination as "the process whereby a person ends with an unwanted judgment, emotion or behavior because of mental processing that is unconscious or uncontrollable, with unwanted meaning that the judgment maker would prefer not to be influenced by the mental process in question."

The two choice phenomena we consider, asymmetric dominance and compromise, also make correction for such influences of the unacceptable option unlikely, although for different reasons. Asymmetric dominance is thought to be perceptual in nature and thus more automatic—the consumer thinks the target is chosen because of its better score on an attribute that is important to him, thus based on the consumer's underlying preferences and not on the option's dominating position (Dhar and Simonson 2003). As a result, individuals may not correct for the context-defining effect of the unacceptable option due to lack of awareness of being biased. Compromise, however, is seen as a more conscious process with the consumer choosing the target option because of its middle position. Because this is perceived by the consumer as a way to resolve preference in the face of conflicts regarding attribute tradeoffs (Dhar and Simonson 2003) and thus facilitates the decision making process (Novemsky et al. 2004), the consumer may not correct for any influence of the unacceptable option. That is, people might recognize the power of the influences but be perfectly willing to be affected by them (Wilson and Brekke 1994).

The above discussion, based on context-dependent preferences, contamination, and lack of correction, leads to the following alternative hypothesis:

H1b: A truly unacceptable decoy option (and the information it contains) will have an impact on the subsequent choice phase and final choice of the best option. Thus an unacceptable decoy will not nullify known context effects.

An empirical test of whether the presence of a truly unacceptable option in the set affects subsequent choice or not will be presented in chapter 3.

CHAPTER III :

RESEARCH

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RESEARCH

III.1 STUDY 1: THE TRULY UNACCEPTABLE OPTION AND THE FINAL CHOICE MADE

This first study examines whether the presence of a truly unacceptable option in the set affects subsequent choice (does not nullify context effects, hypothesis 1b) or does not (nullifies context effects, hypothesis 1a).

III.1.1 METHOD

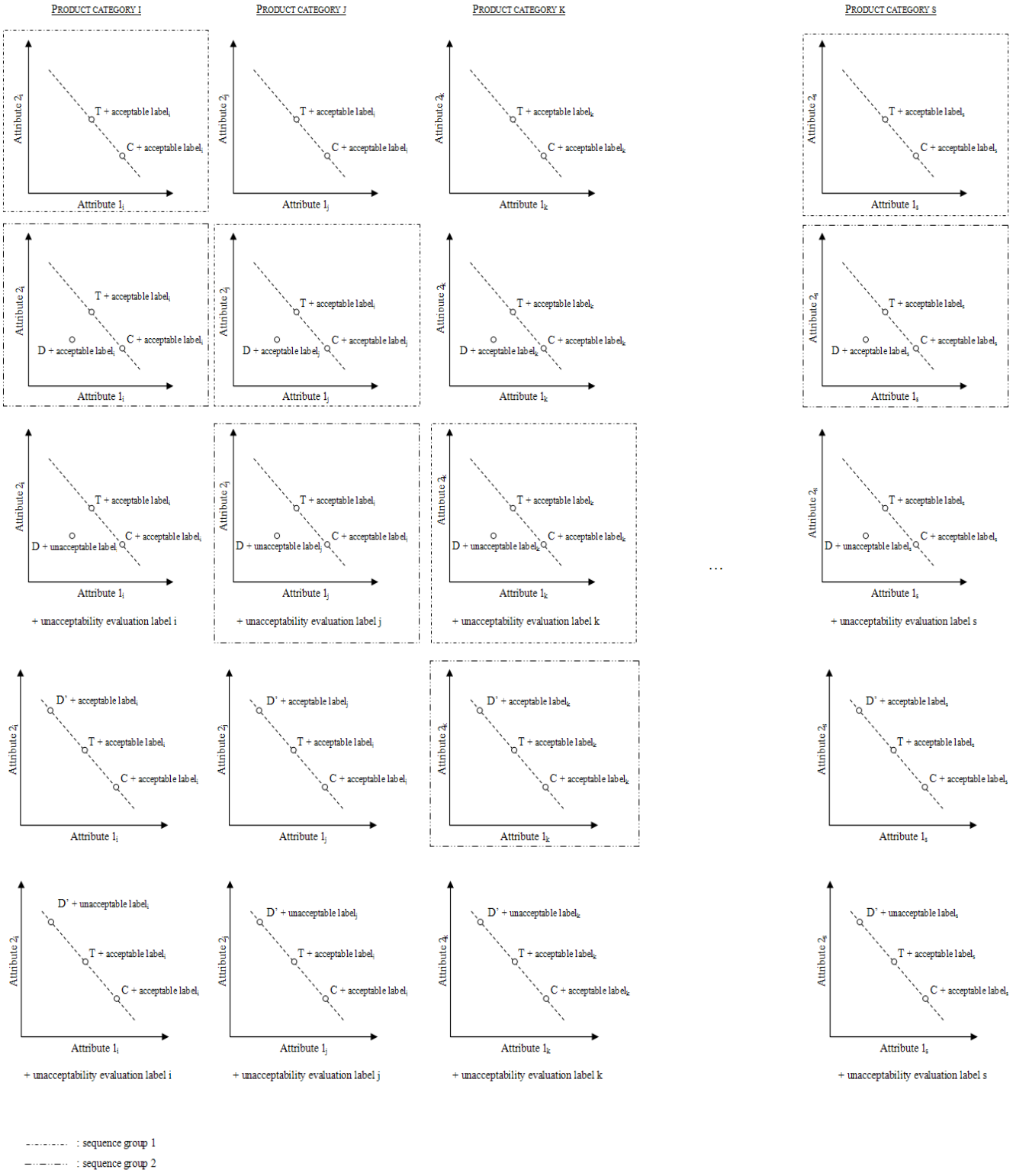
Participants. A total of 268 European university students participated in this study. Five of them were eliminated because of incomplete or cursory survey completion. The survey was administered in a consumer lab on a computer and took about 15 to 20 min. to complete. In return for their cooperation, the participants received a cinema ticket.

Task and Design. Choices were made in each of 11 product categories: CD player, cornflakes, restaurant, paper towel, digital photo camera, student room, portable PC, potato chips, overnight accommodation, printer paper and microwave oven. Five different types of choice sets were used within each of the 11 categories: a two-option choice set containing a target and a competitor (type 1); a three-option set with asymmetric dominance due to an acceptable decoy (type 2); a three-option set with asymmetric dominance due to an unacceptable decoy (type 3); a three-option set with compromise due to an acceptable decoy (type 4); and a three-option set with compromise due to an unacceptable decoy (type 5) (figure 7). In each of these sets, the target and the competitor always had an acceptable level for the categorical attribute.

Because we need to compare choice shares for several types of choice sets within the same category (e.g., digital photo camera, two-option set versus digital photo camera, three-option set with compromise due to an unacceptable decoy), we used the same sequence of categories for all these types of choice sets. Participants were divided into five different groups, and each participant made choices from only one type of choice set for any given product category. However, to provide variety and greater engagement in participants' choices, each participant made choices of all five types, rotated across product categories by group in an approximately balanced way. That is, participants in group 1 chose from choice sets of type 1 for product category 1 (CD player), choice sets of type 2 for product category 2 (cornflakes), etc.; participants in group 2 chose from choice sets of type 2 for product category 1, sets of type 3 for category 2, etc.; and participants in group 5 chose from sets of type 5 for category 1, sets of type 1 for category 2, etc. With five types of choice sets across 11 categories perfect balance was not possible, but the design ensured that each participant experienced each choice type at least twice.

To verify whether classical context effects hold, we first compare selections in the two-option choice set containing a target and a competitor and the three-option set with asymmetric dominance/compromise due to an acceptable decoy. Comparing the two-option set and the three-option set with asymmetric dominance/compromise due to an unacceptable decoy made it possible to check for the existence of context effects even in the presence of an option with a truly unacceptable feature. Examining the three-option set with asymmetric dominance/compromise due to an acceptable decoy versus an unacceptable decoy gave additional insight into the relative magnitude of context effects when adding an acceptable versus an unacceptable alternative to the set. Both asymmetric dominance and compromise were used in order to be able to generalize the findings.

Figure 7: Design of study 1 including 11 product categories and 5 types of choice sets



Operationalization. The selection of the labels, operationalizing the categorical attributes and the choice of corresponding product categories was based partially on some labels found in the real world and on product categories found in articles on context effects (e.g., Heath and Chatterjee 1995; Lehmann and Pan 1994). Furthermore, both labels and categories were chosen to be meaningful to a European student population. The CE label (Conformité Européene) is used for CD player, digital photo camera, portable PC and microwave oven. Buying a product without a CE label in the EU is illegal and signifies it may be unhealthy or unsafe or dangerous for the environment. The GMI label was used for cornflakes and potato chips. GMI means the product contains genetically modified ingredients, a major issue for European consumers. The EU flower label was used for paper towels and printer paper. This label signifies that the product was made in an environmentally responsible way. A cleanliness label was used for restaurant and overnight accommodations, with lack of such a label indicating problems with cleanliness. Finally, a fire safety label was used for student rooms, with lack of the label indicating problems with fire safety. The CE label, the GMI label and the EU flower label are existing labels in the EU, whereas the cleanliness label and the fire safety label were invented labels. Appendix 1 lists a description of the labels, including their symbols, as used in the questionnaire.

To ensure that levels of the continuous attributes were realistic, we consulted Consumer Reports, websites selling the product categories used, and producers' websites. We adjusted levels to make sure that the percentage of the market range covered by the target and the competitor's attribute levels was about 17% for both continuous attributes within a particular category. This controls for differences in choice due to differing ranges of the attributes' levels in the set and thus the relative importance of the attributes. The continuous attributes and their levels for each of the 11 product categories, and for both context types are shown in appendix 4.

A pretest preceded this study, with two purposes: (1) to find labels that, in combination with specific product categories, produce a sufficiently high percentage of participants denoting the label as truly unacceptable and (2) to search for appropriate product category, continuous attribute, and attribute level combinations that ensure roughly equal preference (i.e., a 50/50 distribution) for both target and competitor in the two-alternative condition. Following these pretests, some changes were made to ensure that stimuli best met the criteria above.

The pretest on the label was completed by 225 university students. Six labels (combined with 11 categories) were checked, and five of them were retained (table 1). The room quality label was skipped in favor of the fire safety label (both linked to the student room), as it obtained a lower unacceptability percentage. In addition, to make sure that the label was not indicated as being truly unacceptable just because of the order in which it appeared in the questionnaire (see procedure for details on unacceptability measurement), a possible order effect was checked for but not found.

Table 1: Percentage "truly unacceptable", per label, per product category – Pre-test results

Perceived as truly unacceptable (%)											
Label	CE				GMI		Cleanliness		EU flower		Fire safety
Product category	CD player	Digital camera	PC	Microwave	Cornflakes	Potato chips	Restaurant	Overnight accomm.	Paper towel	Printer paper	Student room
Truly unacceptable	56.4 (39)	50 (38)	62.9 (35)	73 (37)	53.8 (39)	45.9 (37)	57.9 (38)	43.2 (37)	48.6 (35)	33.3 (39)	48.7 (39)

Note. Sample sizes reported in parentheses under percentage "truly unacceptable".

The pretest on equal preference was completed by 472 university students. For certain categories up to five rounds of testing, with several alterations of attributes and/or attribute levels, were necessary before obtaining a satisfying distribution (table 2). We checked for a possible effect of the position of the option in the productXattribute matrix (first versus last), but no such effect was found.

Table 2: Relative choice share T/(T+C) for the two-option set, for each of the 11 product categories – Pre-test results

Choice share of target relative to competitor (%)						
Product category	CD player	Digital camera	PC	Microwave	Cornflakes	Potato chips
Nr of rounds	2	2	3	2	5	4
Distribution last round	54.5 (33)	57.6 (33)	50 (30)	47.1 (34)	51.5 (33)	52.9 (34)
Product category	Restaurant	Overnight accomm.	Paper towel	Printer paper	Student room (Fire safety label)	
Nr of rounds	2	3	3	2	5	
Distribution last round	54.5 (33)	44.8 (29)	51.7 (29)	52.9 (34)	50 (34)	

Note. Sample sizes reported in parentheses under relative choice shares.

Procedure. Participants were asked to imagine making a choice in a category and then received information (description and market range, if applicable) on the two continuous attributes and one categorical label. They were told that other attributes, including price, were identical for the different options (Huber and Puto 1983; Ratneshwar et al. 1987; Simonson 1989). After processing this information, the participant was asked to make a choice from a set of either two or three options, depending upon which of the five choice set conditions he or she was in, presented in a productXattribute matrix. The competitor was the first product

listed, followed by the target, and the decoy, if present, was listed in last position. The participant then repeated this process for the remaining 10 product categories, with type of choice set rotated across categories as described above.

After all choices were completed, participants assessed the label's unacceptability for the three-option unacceptable decoy sets presented to them. Using Park's (1978, 1982) classification of product dimensions, participants characterized the label as falling into one of the following four categories: truly unacceptable; acceptable, but it had to be offset by another feature; acceptable, but influenced the degree of preference in a negative way; and irrelevant to my choice (appendix 3). The productXattribute matrix, indicating the participant's earlier choice in an extra column, and the label's definition were shown to the participant again prior to this unacceptability assessment.

Appendix 5 contains screenshots for each of the steps described above (i.e., description of the attributes, choice matrix, unacceptability assessment), as used in the Dutch questionnaire.

III.1.2 RESULTS

The percentage "truly unacceptable" is given in table 3 for each label-product category combination. Note that the GMI label is unexpectedly low in the degree to which it yields unacceptable options in this study. The second column of table 4, titled "two-option set, no decoy" shows that the choice distribution between the target and the competitor is relatively close to 50/50 for each of the 11 categories.

Table 3: Percentage "truly unacceptable", per label, per product category – Experimental results

Perceived as truly unacceptable (%)											
Label	CE				GMI		Cleanliness		EU flower		Fire safety
Product category	CD player	Digital camera	PC	Microwave	Cornflakes	Potato chips	Restaurant	Overnight accomm.	Paper towel	Printer paper	Student room
Truly unacceptable	63.5 (104)	67.6 (105)	76.4 (106)	75 (104)	22.6 (106)	18.9 (106)	61.3 (106)	55.2 (105)	37.1 (105)	41.9 (105)	77.9 (104)

Note. Sample sizes reported in parentheses under percentage "truly unacceptable".

Table 4 presents the choice share of the target relative to the competitor for the different choice set types for each of the 11 product categories and overall. To examine hypotheses 1a and 1b, we carry out the following comparisons for both the asymmetric dominance and the compromise sets: no decoy – acceptable decoy, no decoy – unacceptable decoy, and acceptable decoy – unacceptable decoy. The results can be summarized by examining the overall percentages in table 4.

First we see that relative to the two-option set, adding an asymmetrically dominated decoy increases the relative share of the target from 50.6% to 71.5%. Similarly, making the target the compromise increases its share to 69.6%. These results replicate the classic asymmetric dominance and compromise effects. Next, we examine the same contrasts for cases where the decoy is designated as unacceptable by the decision maker. There we see that the asymmetric dominance target share has smaller gain to 66.7% and compromise shows a gain to 65%. Thus it appears that making the decoy unacceptable slightly decreases the context effect, but does not eliminate it.

Table 4: Relative choice share T/(T+C) for the different choice set types, for each of the 11 product categories and overall

Choice share of target relative to competitor (%)					
Product category	Two-option set, no decoy	Asymmetric dominance		Compromise	
		Three-option set, acceptable decoy	Three-option set, unacceptable decoy	Three-option set, acceptable decoy	Three-option set, unacceptable decoy
CD player	60.4 (53)	75.5 (54)	71.9 (32)	76.2 (52)	67.6 (34)
Digital camera	50.0 (54)	71.7 (53)	50.0 (38)	84.4 (51)	66.7 (33)
Portable PC	58.8 (51)	80.4 (53)	76.9 (39)	74.0 (53)	78.6 (42)
Microwave	52.8 (53)	74.1 (54)	66.7 (39)	53.2 (52)	74.4 (39)
Cornflakes	39.2 (51)	56.6 (53)	66.7 (9)	45.8 (53)	46.7 (15)
Potato chips	46.2 (52)	56.9 (51)	91.7 (12)	55.3 (54)	57.1 (8)
Restaurant	53.8 (52)	80.4 (51)	79.3 (29)	82.6 (54)	61.1 (36)
Overnight accommodation	50.9 (53)	60.8 (52)	60.0 (25)	76.5 (53)	57.6 (33)
Student room	39.6 (53)	61.1 (54)	51.2 (41)	52.3 (52)	37.5 (40)
Paper towel	43.4 (53)	84.3 (52)	70.0 (20)	84.8 (53)	68.4 (19)
Printer paper	61.1 (54)	88.4 (53)	73.7 (19)	88.6 (51)	92.0 (25)
Overall	50.6 (579)	71.5 (580)	66.7 (303)	69.6 (578)	65.0 (324)

Note. Sample sizes reported in parentheses under relative choice shares.

Appropriate statistical tests are based on logistic regression, run separately for asymmetric dominance and compromise. First we test the significance of the standard decoy effects and then whether making the decoy unacceptable further affects choice.

Context Effects with an Acceptable Decoy. We first check for replication of standard asymmetric dominance and compromise effects by focusing on the two-option, no decoy and the three-option, acceptable decoy sets. If context effects are not found for the unacceptable decoy, this needs to be attributed to the unacceptable option, not to the possibility that the experimental stimuli might not have been capable of inducing context effects.

The following logistic regression model is used for our tests:

$$\text{Choice of target} = \text{constant} + \text{decoy type} + \text{product category} + \text{decoy type x product category} \quad (1)$$

with "decoy type" defined as acceptable decoy compared with no decoy at all and "product category" as CD player, cornflakes, etc.

Including the interaction term makes it possible to check whether the product category acts as a moderator of the preference-decoy type relationship. This same model is used for all further comparisons made within the present experiment; only the decoy type will be differently defined each time.

The results indicate that the product category is not a moderator for asymmetric dominance ($\chi^2(21) = 97.87$, $p_{\text{interaction term}} > .10$), but it is a moderator for compromise ($\chi^2(21) = 104.52$, $p_{\text{interaction term}} < .05$). With regard to the latter, the categories paper towel and microwave oven show different effects compared to the other product categories: paper towel

shows a very large increase in preference for the target relative to the competitor when an acceptable decoy is added to the set, whereas microwave oven shows a very small increase.

We replicate standard context effects. Acceptable decoys influence relative preference ($\chi^2_{\text{asymmetric dominance}}(21) = 97.87$, $\chi^2_{\text{compromise}}(21) = 104.52$, $p_{\text{decoy type term}} < .001$ for both asymmetric dominance and compromise), and these effects are positive ($b_{\text{asymmetric dominance}} = .983$, $b_{\text{compromise}} = .947$), showing that the addition of an acceptable decoy to the choice set significantly increases the choice share of the target relative to the competitor[4].

Because of the relatively small sample sizes and the aim of the current study to generalize the findings, and thus not to restrict the findings to a single category, the statistical procedure as proposed and applied by Huber and Puto (1983) is used in the current study. This procedure uses the Fisher Exact Test (Siegel 1956) to test the null model, that coincides with the assumption of proportionality[5], within each product class. The probability values for these tests are then aggregated across classes by assigning a chi-square value that corresponds to the probability of the data given the null model ($\chi^2(2) = -2 \ln p$). Since the product classes reflect decisions on different items using very different dimensions, it is reasonable to assume that the resulting test statistics are independent. An aggregate test is then formed by using the additivity property of independent chi-square statistics. Table 5 below lists the complete p-

[4] The above analysis is based on deviation coding for the product category variable. The results for the simple model containing only the decoy type as an independent variable are as follows:
… Acceptable decoys influence relative preference ($\chi^2_{\text{asymmetric dominance}}(1) = 52.68$, $\chi^2_{\text{compromise}}(1) = 39.99$, $p_{\text{decoy type term}} < .001$ for both asymmetric dominance and compromise), and these effects are positive ($b_{\text{asymmetric dominance}} = .895$, $b_{\text{compromise}} = .805$).

[5] Assumption of proportionality: the new item takes share from existing items in proportion to their original shares. Thus, no influence of the added item on the relative choice share T/(T+C), and as such no context effect, is assumed.

values and associated chi-square statistics for the several product categories and the aggregate test for both context types (i.e., asymmetric dominance and compromise).

Identical results in terms of significance are found (asymmetric dominance: $\chi^2(22) = 91.4$, $p < .001$; compromise: $\chi^2(22) = 88.9$, $p < .001$) compared to the logistic regression findings.

Table 5: Acceptable decoy versus no decoy - Fisher Exact Test per category and aggregated chi-square statistics

	Asymmetric dominance		Compromise	
Product category	p (Directional Fisher Exact Test)	$\chi^2(2) = -2*\ln(p)$	p (Directional Fisher Exact Test)	$\chi^2(2) = -2*\ln(p)$
CD player	.077	5.1	.078	5.1
Digital camera	.018	8.0	0.0001	18.4
Portable PC	.015	8.4	.08	5.1
Microwave	.018	8.0	.565	1.1
Cornflakes	.057	5.7	.322	2.3
Potato chips	.187	3.4	.239	2.9
Restaurant	.004	11.0	.002	12.4
Overnight accommodation	.208	3.1	.015	8.4
Student room	.021	7.7	.149	3.8
Paper towel	0.0001	18.4	0.0001	18.4
Printer paper	.002	12.4	.004	11.0
Aggregate test (proportionality)	$\chi^2(22) = 91.4$, $p < .001$; Critical χ^2 value for ($\alpha = .001$) = 48.27		$\chi^2(22) = 88.9$, $p < .001$; Critical χ^2 value for ($\alpha = .001$) = 48.27	

Context Effects with an Unacceptable Decoy. Next, we check whether hypothesis 1a or hypothesis 1b holds. In particular, we examine whether the truly unacceptable option and the information it contains is eliminated in an initial editing phase and thus does not influence the subsequent choice phase (hypothesis 1a), or whether the information characterizing the unacceptable still plays a role in the further decision process by helping to define the context within which the final choice is made (hypothesis 1b).

We applied the same statistical procedure as above, except that the logistic model's decoy type is now defined as unacceptable decoy versus no decoy at all, where the unacceptability evaluation of the label is used to restrict the analysis to only those participants rating the label as truly unacceptable (roughly 55% of the participants overall; table 3).

For both asymmetric dominance and compromise, the product category doesn't significantly moderate the preference-decoy type relationship ($\chi^2_{\text{asymmetric dominance}}$ (21) = 52.6, $\chi^2_{\text{compromise}}$ (21) = 61.95, $p_{\text{interaction term}} > .10$). For both context settings, unacceptable decoys influence relative preference ($\chi^2_{\text{asymmetric dominance}}$ (21) = 52.6, $\chi^2_{\text{compromise}}$ (21) = 61.95, $p_{\text{decoy type term}} < .001$) with a positive b-coefficient (asymmetric dominance = .850, compromise = .650)[6]. Thus, even though the decoy is considered to be truly unacceptable by respondents, its addition to the choice set still increases the choice share of the target relative to the competitor, resulting in an asymmetric dominance/compromise effect. These findings support hypothesis 1b: the unacceptable option influences the subsequent choice phase by helping to define the context within which the final choice is made. The fact that the influence of the unacceptable is found in both the asymmetric dominance and the compromise setting strengthens this conclusion.

Identical results in terms of significance are found when applying the Fisher Exact Test in combination with chi-square statistics (asymmetric dominance*:* $\chi^2(22) = 52.4$, $p < .001$; compromise: $\chi^2(22) = 46.7$, $p < .01$).

[6] The above analysis is based on deviation coding for the product category variable. The results for the simple model containing only the decoy type as an independent variable are as follows:
… For both context settings, unacceptable decoys influence relative preference ($\chi^2_{\text{asymmetric dominance}}$ (1) = 21.15, $\chi^2_{\text{compromise}}$ (1) = 17.65, $p_{\text{decoy type term}} < .001$) with a positive b-coefficient (asymmetric dominance = .669, compromise = .596)

Table 6: Unacceptable decoy versus no decoy - Fisher Exact Test per category and aggregated chi-square statistics

	Asymmetric dominance		Compromise	
Product category	p (Directional Fisher Exact Test)	$\chi^2(2) = -2*\ln(p)$	p (Directional Fisher Exact Test)	$\chi^2(2) = -2*\ln(p)$
CD player	.201	3.2	.325	2.2
Digital camera	.584	1.1	.097	4.7
Portable PC	.056	5.8	.035	6.7
Microwave	.132	4.0	.029	7.1
Cornflakes	.122	4.2	.411	1.8
Potato chips	.004	11.0	.441	1.6
Restaurant	.019	7.9	.324	2.3
Overnight accommodation	.308	2.4	.354	2.1
Student room	.181	3.4	.496[7]	1.4
Paper towel	.038	6.5	.054	5.8
Printer paper	.243	2.8	.004	11.0
Aggregate test (proportionality)	$\chi^2(22) = 52.4$, $p < .001$; Critical χ^2 value for ($\alpha = .001$) = 48.27		$\chi^2(22) = 46.7$, $p < .01$; Critical χ^2 value for ($\alpha = .01$) = 40.29	

Comparing the Unacceptable and the Acceptable Decoy Case. Finally, we compare the relative magnitude of the effect of the acceptable decoy and the unacceptable decoy, testing the significance of the mean decrease in the magnitude of the effect due to the unacceptable nature of the decoy, namely a 4.8% drop for the asymmetric dominance case and a 4.6% drop for the compromise case.

We ran a logistic regression analysis contrasting decoy type defined as unacceptable decoy versus acceptable decoy, using only participants rating the label as truly unacceptable in the unacceptable decoy setting. In this analysis, the product category doesn't act as a moderator ($\chi^2_{\text{asymmetric dominance}}(21) = 52.95$, $\chi^2_{\text{compromise}}(21) = 84.86$, $p_{\text{interaction term}} \geq .10$). More important, the decoy type term is not significant for either asymmetric dominance ($p_{\text{decoy type term}} >$

[7] 1-p is listed as the addition of the unacceptable decoy decreased the relative choice share T/(T+C) for the student room category.

.10) or compromise ($p_{\text{decoy type term}} = .105 > .10$)[8]. Thus, whether the decoy is acceptable or unacceptable, the preference for the target relative to the competitor is not significantly changed. This further supports the importance of the role of the truly unacceptable option.

Applying the Fisher Exact Test in combination with chi-square statistics shows a somewhat different picture: for compromise the relative preference drops significantly when the decoy is considered to be truly unacceptable by respondents (asymmetric dominance: $\chi^2(22) = 26.8$, $p > .10$; compromise: $\chi^2(22) = 35$, $p < .05$).

[8] The above analysis is based on deviation coding for the product category variable. The results for the simple model containing only the decoy type as the independent variable are as follows:

… More important, the decoy type term is not significant for either asymmetric dominance or compromise ($\chi^2_{\text{asymmetric dominance}}(1) = 2.14$, $\chi^2_{\text{compromise}}(1) = 1.88$, $p_{\text{decoy type term}} > .10$).

Table 7: Unacceptable decoy versus acceptable decoy - Fisher Exact Test per category and aggregated chi-square statistics

	Asymmetric dominance		Compromise	
Product category	p (Directional Fisher Exact Test)	$\chi^2(2) = -2*\ln(p)$	p (Directional Fisher Exact Test)	$\chi^2(2) = -2*\ln(p)$
CD player	.455	1.6	0.284	2.5
Digital camera	.029	7.1	0.059	5.7
Portable PC	.442	1.6	0.604	1.0
Microwave	.292	2.5	0.965	0.1
Cornflakes	.573[9]	1.1	0.407	1.8
Potato chips	.978	0.0	0.373	2.0
Restaurant	.563	1.1	0.027	7.2
Overnight accommodation	.571	1.1	0.083	5
Student room	.225	3.0	0.127	4.1
Paper towel	.151	3.8	0.124	4.2
Printer paper	.142	3.9	0.492	1.4
Aggregate test (proportionality)	$\chi^2(22) = 26.8$, $p > .10$; Critical χ^2 value for ($\alpha = .10$) = 30.81		$\chi^2(22) = 35$, $p < .05$; Critical χ^2 value for ($\alpha = .05$) = 33.92	

III.1.3 DISCUSSION

The findings of this first study indicate that editing is rarely as surgical as has been assumed. The presence of a truly unacceptable option in the set biases the consumer's final choice by altering the perceived context within which this final choice is made. Put differently, making the decoy unacceptable has minimal impact on standard asymmetric dominance or compromise effects. Thus, it appears that unacceptability does not significantly limit the option's contextual impact. The Fisher Exact Test results indicate that the conclusion might be less clear-cut for the compromise case: there is still an effect of the unacceptable decoy on final choice, but it is reduced in magnitude when compared to the acceptable decoy's influ-

[9] 1-p is listed as the relative choice share T/(T+C) is higher for the unacceptable decoy compared to the acceptable decoy case. And this is true for the categories cornflakes and potato chips in case of asymmetric dominance, and for the categories portable PC, microwave, cornflakes, potato chips and printer paper in case of compromise.

ence. Next we examine whether additional focus on unacceptability can alter these conclusions.

Additional focus on the unacceptable status of an option could change the influence of that option on final choice through an attentional or a correction mechanism. Attentionally, any increase in the attributes of the unacceptable alternative could lead to greater contextual influence. More likely, we hypothesize that this same attention could stimulate mechanisms for correcting for mental contamination. Correction mechanisms mentioned by Wilson and Brekke (1994) include trying to increase awareness of bias, asking people to correct for their exposure to contaminants, or warning people that they are about to be contaminated. Concentrating on the first mechanism, drawing people's attention to potentially biasing information could lead to increased correction. For example, Strack et al. (1993) used a priming task that activated either positive or negative traits before asking respondents to form an impression of a target person. In addition, respondents were either reminded or not reminded of the priming task prior to the impression formation task. Strack et al. found a contrast effect away from the primes when respondents were reminded of the task but found no such correction among respondents who were not reminded. In a study in a choice setting, Houghton et al. (1999) sensitized consumers to factors that impact their choices (i.e., context effects) by explicitly stating the relation among the options in the set. They argued that making the context more transparent may lead consumers to consider whether their preferences should be influenced by the positions of the options in the choice set under consideration, potentially reducing their susceptibility to context effects. The study showed that the explicit statement of the relative positions of the options in the set triggered correction processes, as such reducing the tendency to choose the compromise and asymmetrically dominating options.

Following the above reasoning, we hypothesize that making the truly unacceptable option and its truly unacceptable levels more explicit or salient in the set will trigger a correction process and reduce the unacceptable option's effect on the final choice. We make the unacceptable option more explicit by asking participants to mark truly unacceptable levels and corresponding options in an initial phase. This information is retained, and participants subsequently make a choice within a set still listing the screened out option(s), with the unacceptable level(s) in red and marked with a red asterisk.

H2: Emphasizing the option's unacceptability triggers a correction process, reducing its influence on the final choice made.

III.2 STUDY 2: THE REDUCTION OF THE TRULY UNACCEPTABLE OPTION'S INFLUENCE BY MAKING THE UNACCEPTABILITY SALIENT

Study 2 examines the possibility of reduced influence of the truly unacceptable option on the decision process when its unacceptability is made salient (hypothesis 2).

III.2.1 METHOD

Participants. A total of 131 European university students participated in this second study. Seven of them were eliminated because they didn't understand the meaning of a red level accompanied by an asterisk in the choice matrix (part of the explicit unacceptable manipulation). Two additional participants were dropped because they chose one of the options within the choice set, yet indicated truly unacceptable levels for each of these options in the initial phase. In return for a candy bar and a chance to win a city trip, participants spent about 10 to 15 min. completing the survey on computers in a consumer lab.

Task and Design. The task involved the choice of options from sets with three alternatives, including an asymmetrically dominated decoy, in two categories (portable PC and restaurant; appendix 9). In each of the categories the unacceptable decoy was emphasized as described above. To examine whether a decrease in relative choice share was obtained when comparing this explicit unacceptable case to the implicit one, we used data from study 1 for the same categories but for the case where the unacceptable decoy was more implicitly defined. The findings for the two-option set, the three-option set with acceptable decoy, and the three-option set with implicit unacceptable decoy are taken from the previous study (table 4) and are repeated in the first three columns of results in table 8. These results show that there

were asymmetric dominance effects for both the acceptable (logistic regression model: $\chi^2(3) = 14.26$, $p_{\text{interaction term}} > .10$, $p_{\text{decoy type term}} < .001$, $b = 1.156$) and the implicit unacceptable decoys ($\chi^2(3) = 9.02$, $p_{\text{interaction term}} > .10$, $p_{\text{decoy type term}} < .01$, $b = 1.018$), with no significant difference between these two effects ($\chi^2(3) = .20$, $p_{\text{interaction term}} > .10$, $p_{\text{decoy type term}} > .10$).

Operationalization and Procedure. The operationalization of the current study is based on that detailed in study 1. The key difference is that this second study makes the unacceptable more explicit. In contrast to the first study, where the participant was asked to make a choice within a set listing an option with a possibly truly unacceptable label and to rate the unacceptability of this label afterwards, unacceptability is made explicit in this second study by rating and emphasizing unacceptability before making the final choice. In particular, the definition of a truly unacceptable level (Park 1978, 1982) was first given to participants. Next, the participant saw a productXattribute matrix, marked truly unacceptable levels for any of the three attributes, and then marked the corresponding truly unacceptable options. Participants were told that they were free to indicate any number of unacceptable levels per option and were free to mark any number of options as being truly unacceptable, including none at all (appendix 7). Following this marking process, the choice matrix was shown on a separate screen, still containing the option(s) marked as being truly unacceptable. Furthermore, the level they listed as truly unacceptable was printed in red and highlighted with a red asterisk to remind the participant that this level was in fact truly unacceptable and hence the option with that level should not be an option for final choice (appendix 8). This presentation of a truly unacceptable option with red levels in a choice matrix parallels what is done in realistic settings (e.g., compusa.com, activebuyersguide.com and myproductadvisor.com; appendix 6).

Appendix 10 contains screenshots of the unacceptability rating and the subsequent choice matrix as used in the Dutch questionnaire.

III.2.2 RESULTS

Examining table 8, we observe a reduced effect of the unacceptable option when the option's unacceptability is made salient, seemingly supporting hypothesis 2. There is a 12.2% drop in overall relative choice share when comparing the explicit to the implicit unacceptable decoy case.

Table 8: Relative choice share T/(T+C) for the different choice set types, for each of the two product categories and overall

Choice share of target relative to competitor (%)				
Product category	Two-option set no decoy	Asymmetric dominance		
		Three-option set, acceptable decoy	Three-option set, implicit unacceptable decoy	Three-option set, explicit unacceptable decoy
Portable PC	58.8 (51)	80.4 (53)	76.9 (39)	69.1 (55)
Restaurant	53.8 (52)	80.4 (51)	79.3 (29)	61.7 (47)
Overall	56.3 (103)	80.4 (104)	77.9 (68)	65.7 (102)

Note. Sample sizes reported in parentheses under relative choice shares.

The data used to test hypothesis 2 are from the first study for the implicit unacceptable results, using only those participants who rated the absence of the CE/Cleanliness label as truly unacceptable (in the asymmetric dominance setting, the percentages of truly unacceptable for the CE label and the Cleanliness label were respectively 72.2%, n = 54 and 54.7%, n = 53). For the explicit unacceptable setting, only those participants marking the absence of the decoy's label as truly unacceptable are included (CE label: 91.7% of the sample mark the label as truly unacceptable, n = 60; Cleanliness label: 75.8%, n = 62). In the current study, other levels of the three options could have been marked by participants as being unacceptable. However, in study 1 this was not an option. Thus, to keep the data as comparable as possible,

we did not omit participants from study 2 if they marked unacceptable levels for the continuous attributes.

A logistic regression analysis was run using the following model:

$$\text{Choice of target} = \text{constant} + \text{unacceptable type} + \text{product category} + \text{unacceptable type x product category} \quad (2)$$

with emphasized unacceptability being contrasted with implicit unacceptability and "product category" defined as portable PC, restaurant.

Product category does not significantly moderate the preference-unacceptable type relationship ($\chi^2(3) = 3.69$, $p_{\text{interaction term}} > .10$). Most important, unacceptable type influences relative preference at a marginally significant level ($p_{\text{unacceptable type term}} = .082$). This, in combination with the negative b-coefficient (-.633), provides marginal support for hypothesis 2[10].

When applying the Fisher Exact Test in combination with chi-square statistics even this marginal support for hypothesis 2 no longer holds ($\chi^2(4) = 7.5$, $p > .10$).

[10] The above analysis is based on deviation coding for the product category variable. The results for the simple model containing only the decoy type as the independent variable are as follows:
… unacceptable type influences relative preference at a marginally significant level ($\chi^2(1) = 3.02$, $p_{\text{unacceptable type term}} = .088$). This, in combination with the negative b-coefficient (-.613), provides marginal support for hypothesis 2.

Table 9: Emphasized unacceptable decoy versus implicit unacceptable decoy - Fisher Exact Test per category and aggregated chi-square statistics

Asymmetric dominance		
Product category	p (Directional Fisher Exact Test)	$\chi^2(2) = -2*\ln(p)$
Portable PC	.275	2.6
Restaurant	.087	4.9
Aggregate test (proportionality)	$\chi^2(4) = 7.5$, $p > .10$; Critical χ^2 value for ($\alpha = .10$) = 7.78	

III.2.3 DISCUSSION

Correction is moderate when making the option's unacceptability salient in the choice set. Thus, the distorting effect of the unacceptable on choice seems surprisingly robust. In addition, comparing the relative choice share for the explicit unacceptable decoy to the no decoy case in table 8 still shows an increasing trend (of 9.4%). A comparison of these shares might not be strictly appropriate, as they are obtained in different experiments, using different unacceptability manipulations. Nevertheless, if anything they hint at the possibility that context effects still occur even when unacceptability is made salient; the truly unacceptable and clearly screened out option may influence the subsequent decision process.

In combination, these first two studies suggest that the presence of a truly unacceptable option in the choice set affects the final choice between the remaining alternatives and that even drawing people's attention to the option's unacceptable status does not seem to nullify its effect (perhaps suggesting a nonconscious process). However, these findings have to be interpreted in the light of the unacceptable option's operationalization. In study 1 the option's unacceptability might not have been clear from the outset, thus causing attribute levels other than the unacceptable aspect to be processed before the option's unacceptable status was recognized. In study 2, even though the unacceptable level was printed in red in the choice matrix, participants had to process all the attribute levels present in the matrix, including the lev-

els other than the unacceptable aspect for the decoy option, because they were asked to evaluate each attribute level and to mark those experienced as truly unacceptable. Thus, we examine whether the findings of studies 1 and 2 hold when the unacceptable status is made clear up front (which more closely resembles the phased choice processing mentioned in the introduction to hypothesis 1a). In addition, unacceptable status was idiosyncratically defined across participants in studies 1 and 2. In both studies labels were introduced to make the decoy an unacceptable alternative (e.g., CE label absent), but it was up to the participant to define whether the absence of such a label was truly unacceptable to him or her. A self-selection bias might have resulted because of this (self-selection bias is possible whenever the group of people being studied has any form of control over whether to participate. Participants' decision to participate may be correlated with traits that affect the study, making the participants a non-representative sample. For example, volutary IQ-tests are more likely to be taken by people who think they are more intelligent than the average).

A third study was designed to alleviate the above two issues by introducing an agent task. Participants were asked to imagine that they had been asked by their best friend to buy him/her a digital photo camera, with the friend listing demands (e.g., "I definitely want a pocket-sized model. Any larger or smaller model is truly unacceptable to me, so I don't want you to buy such a camera for me no matter what else it has to offer") and preferences (e.g., "The higher the camera's reliability, the better") with regard to the camera. Thus, it was no longer up to the participant to decide for himself/herself whether, for example, the presence of a medium-sized camera in the choice set was treated as truly unacceptable or not. Furthermore, this formulation of demands and preferences caused camera size to be a rejection inducing dimension and reliability to be a relative preference dimension, and the former has been shown to be the most important attribute in the early phase of the decision making process (Park 1982). In combination with the positioning of the camera size attribute on the left in the

choice matrix (assuming the common reading order is from the left to the right), this should cause size to be the first attribute focused on in the matrix, making the decoy option's unacceptability clear from the outset without having to process values other than the unacceptable aspect before finding this out. The use of an agent task in study 3 also made it possible to emphasize the alternative's unacceptable status (as such perhaps triggering a correction process) by printing the unacceptable level in red without the inclusion of a preceding marking process (as was the case in study 2).

III.3 Study 3: The Truly Unacceptable Option and the Final Choice Made – A Strong Test and an Examination of the Nonconscious Process Idea

The third study accomplished several goals. Beyond providing a strong test of the effect of the unacceptable option on subsequent choice by making the unacceptable status clear from the beginning and no longer idiosyncratic, as delineated in the previous study, a second goal was to offer a more complete test of study 2's idea by including all the necessary choice sets within the same experiment (i.e., no decoy, acceptable decoy, black unacceptable decoy, and red unacceptable decoy). Furthermore, compromise was included as a choice context in addition to asymmetric dominance. A third goal was to examine the "nonconscious process" idea (part of the introduction to hypothesis 1b and suggested on the basis of study 2's findings) by including funnel debriefing.

III.3.1 METHOD

Participants. A total of 350 European university students participated in this third study. Fourteen were eliminated because they incorrectly treated the acceptable decoy's size as truly unacceptable, or vice versa. Also participants who did not focus on the size attribute for the decoy option first or did not understand the meaning of a red level accompanied by an asterisk in the choice matrix were eliminated. The survey was administered in a consumer lab using a computer and took about 20 min. to complete. In return for their cooperation, participants received a cinema ticket.

Task and Design. The experiment employed a 3 (Decoy Type: acceptable/ black unacceptable/ red unacceptable) x 2 (Context Type: asymmetric dominance versus compromise) between-subjects design, with an additional control group (no decoy).

The task involved the choice of a digital photo camera for a close friend, taking his demands and preferences into account. The specific demand was varied across decoy type, in the sense that the friend defined a medium-sized camera as truly unacceptable in the black and the red unacceptable decoy conditions, and this same medium-sized camera as acceptable in the acceptable decoy condition. In each of the conditions, the target and the competitor always had an acceptable level for the size attribute (i.e., pocket-sized). The black versus red unacceptable decoy was varied by printing the camera's medium size level in black or red. In this latter case a note below the choice matrix reminded the participant of the decoy's unacceptable status. Appendix 11 shows the specific wording of the friend's demands and preferences per condition and the corresponding choice matrices.

Operationalization. As in studies 1 and 2, a categorical attribute (i.e., camera size) defined the decoy's unacceptability, and two continuous attributes (i.e., reliability and resolution) defined the context relationships (appendix 13). To control for differences in choice due to any factor different from the context, the following steps were taken: (1) there were identical absolute score differences between target and competitor (i.e., 16.6 - 14.4 = 7.6 – 5.4 = 2.2 units) and identical range spans (i.e., [11-20], [2-11], difference of 9 units) for both reliability and resolution, in order to not affect the relative importance of the attributes, (2) target and competitor were positioned the same percentage above and below the average value for both attributes, and (3) caution was taken to not create an attribute-balance effect (e.g., large dispersion of attribute values within the competitor and small dispersion within the target, leading to choice of the target. The use of different scale metrics, in particular a 20-point scale for reliability and megapixels for resolution, made the attribute-balance effect less likely to occur; Chernev 2004, 2005). In addition, acceptable and realistic levels for both continuous attributes were used.

A pretest preceded this third study, to determine appropriate continuous attribute, attribute level and market range combinations that ensured roughly equal preferences for both target and competitor in the two-alternative condition. This test was completed by 215 university students. Another purpose of this pretest was to check whether the friend's defining camera size as a rejection inducing dimension and the positioning of the size attribute on the left in the choice matrix directed the participants' attention first to this attribute.

Procedure. Participants were asked to imagine buying a digital photo camera for a close friend, with the latter specifying his/her demands and preferences with regard to the camera. Next the attributes camera size, reliability and resolution were described and market ranges were given. As in studies 1 and 2, they were told that the other attributes, including price, were identical for the different options (see appendix 14 for a screenshot). After processing this information, the participant made a choice from a productXattribute matrix, with the instructions stating that the camera was bought for a close friend, not for oneself, and that the friend's demands and preferences had to be taken into account (see appendix 14 for a screenshot). The specific demand and choice matrix shown to the participant depended upon which of the seven choice set conditions he or she was in.

After choosing a camera for his/her friend, participants went through a funnel debriefing task, adapted from Fitzsimons and Shiv (2001) and Chinander and Schweitzer (2003). The purpose of this task was to shed light on the possibly nonconscious nature of the unacceptable alternative's influence on the final choice between the remaining options in the set. First, participants were asked to describe whatever went through their mind while they were deciding between the different cameras, and what they thought the aim of the study was. The second part was more specific, and asked for factors (perhaps less obvious ones) directing the participant's camera choice and to describe in what way, both in open-ended form and by checking

factors from a list of possible factors (including presentation sequence in the table, the scores of camera C[11], the table's blue background colour, the size levels of cameras A and B, and red attribute levels). There was a special interest in whether participants marked camera C's reliability and resolution scores in the latter question, as this could point to a more conscious nature of the unacceptable option's influence on final choice. The other factors were mainly included as distractors. If participants did not mark the scores of camera C as an influential factor, a final part asked: "What if I told you that you choosing camera B and not camera A was very likely influenced by the presence of camera C in the set? What would you say?" and "What if I told you that you choosing camera B and not A, was very likely influenced by camera C's reliability and resolution scores? What would you say?" The funnel debriefing task concluded with a question asking whether camera C was treated as an *acceptable* alternative while choosing a camera for the friend to verify whether it was experienced as an unacceptable camera.

Next, participants were asked to indicate what attribute level they first looked at for camera C: "medium", "18.05"[12], "3.95" or "don't know anymore". As a reminder the initial choice matrix was reproduced below, showing only camera C's levels (i.e., empty cells for cameras A and B). In a subsequent question unacceptability was assessed for each score present in the choice matrix: "Mark the scores that you experienced as *truly unacceptable* while choosing the best possible camera for your friend. Note that you are free to mark *any number of levels, including none at all.*" Prior to this assessment, the definition of a truly unacceptable level (Park 1978, 1982) was shown to the participant (appendix 12). Finally, participants were asked whether all scores in the choice matrix were printed in *black*. If their answer was "no"

[11] Camera C coincides with the unacceptable decoy, camera A with the competitor and camera B with the target.

[12] "18.05" or "16.60" depending on the specific condition the participant was in.

or “don’t know anymore”, they were asked about the possible meaning of printing a level in red and highlighting it with a red asterisk (* red) in the choice matrix.

III.3.2 RESULTS

The unacceptability assessment and whether “medium” was the first attribute level looked at for the unacceptable decoy are used to restrict the analyses to only those participants: (1) not marking the pocket size level for cameras A and B as truly unacceptable (4 participants eliminated), (2) marking camera C’s medium size level as truly unacceptable or not depending upon the condition they were in (unacceptable versus acceptable) (7 participants eliminated), and (3) focusing on the size level for camera C first, as this implied that the values other than the unacceptable aspect didn’t need to be processed before finding out the option was truly unacceptable (1 participant eliminated).

At the outset of study 3 several goals were mentioned, the first of which is a strong test of the effect of the unacceptable alternative on final choice by making the unacceptable status clear from the beginning and no longer idiosyncratic, and a second goal is a more complete test of study 2’s idea by including all the necessary choice sets within the same experiment. For this the choice share of the target relative to the competitor is computed for seven different choice set types (table 10; the necessary preliminary restrictions are detailed in the previous paragraph), and used in comparisons identical to those carried out in studies 1 and 2.

As in study 1, we see that the classic asymmetric dominance and compromise effects replicate. Adding an asymmetrically dominated or extreme decoy to the two-option set increases the relative share of the target from 53.1% to 81.3% and 88.9% respectively. When the decoy’s unacceptability is made clear up front, we see that a slight increase in the asymmetric dominance target’s share is still obtained (59.2% versus 53.1%), although the magni-

tude of the effect is no longer comparable to that of the acceptable decoy (59.2% versus 81.3%). For compromise, there is no increase in target share relative to the two-option set (53.1%). Thus it appears that making the decoy's unacceptable nature clear from the beginning still shows a small asymmetric dominance effect, whereas the compromise effect is eliminated (we report significance tests below).

The small effect of the unacceptable decoy seems to be robust for the asymmetric dominance setting. Emphasizing the option's unacceptability in the choice matrix with red print still shows an increase in target share when compared to the two-option set (60.4% versus 53.1%) and is roughly equivalent to the black unacceptable decoy set (59.2%). Study 3 added a compromise setting, showing a decrease in target share when comparing the red to the black unacceptable decoy though (45.8% versus 53.1%). The target share for the emphasized unacceptable even drops below that of the two-option set.

Table 10: Relative choice share T/(T+C) for the different choice set types, for the digital photo camera category

Choice share of target relative to competitor (%)							
Product category	Two-option set, no decoy	Asymmetric dominance (three-option set)			Compromise (three-option set)		
		Acceptable decoy	Black unacceptable decoy	Red unacceptable decoy	Acceptable decoy	Black unacceptable decoy	Red unacceptable decoy
Digital photo camera	53.1 (49)	81.3 (48)	59.2 (49)	60.4 (48)	88.9 (45)	53.1 (49)	45.8 (48)

Note. Sample sizes reported in parentheses under relative choice shares.

A formal test based on the Fisher Exact Test (one-sided), because of the rather limited number of participants per cell, shows that the classic asymmetric dominance and compromise effects are statistically significant ($p_{\text{acceptable, asymmetric dominance}} < .01$, $p_{\text{acceptable, compromise}} < .001$). However, making the decoy unacceptable and communicating this status up front no

longer yields a significant asymmetric dominance effect ($p_{\text{black unacceptable}} = .342 > .10$) or a significant compromise effect ($p_{\text{black unacceptable}} = .580 > .10$). Thus, the findings of study 1 do not replicate. As no effect is found for the black unacceptable condition, drawing attention towards the unacceptable status by printing the unacceptable value in red in order to make the participant increasingly aware of a possible contamination, and to instigate a correction process (as done in study 2), may no longer make sense. For sake of completeness the p-values are included when contrasting the red with the black unacceptable decoy and the red unacceptable decoy with the no decoy set: $p_{\text{red vs. black unacceptable, asymmetric dominance}} = .467 > .10$, $p_{\text{red vs. black unacceptable, compromise}} = .306 > .10$, $p_{\text{red unacceptable vs. no decoy, asymmetric dominance}} = .300 > .10$, $p_{\text{red unacceptable vs. no decoy, compromise}} = .694 > .10$.

III.3.3 DISCUSSION

The findings of this third study show no influence of the unacceptable option on the consumer's final choice between the remaining options in the set. One simple explanation would be that participants did not look at the values other than the unacceptable aspect. As mentioned in the introduction to hypothesis 1a, if information that an option is unacceptable leads to its immediate elimination in an initial editing phase, this will limit any impact of that alternative (and the information it contains) on the final choice. The operationalization of study 3, as opposed to that of study 1, was precisely aimed at making the decoy option's unacceptability clear from the outset so that participants would not have to process values other than the unacceptable aspect before finding this out (i.e., camera size was made a rejection inducing dimension by way of the agent task, and this attribute was listed on the left in the choice matrix). Unfortunately, to the extent that people did not look at the other attribute values, the funnel debriefing task becomes less useful.

However, the operationalization of study 3 may have been too restrictive. Because of the agent task the participant had to buy a specific digital photo camera for a friend and not for oneself, and hence might have been less willing to exert processing effort (immediately eliminating the camera with an unacceptable size would conform to the friend's specifications, be easy to justify, would be likely to gain the favor of the friend, and would reduce cognitive work by analyzing only two options instead of three; Lerner and Tetlock 1999), and less curious as to what is foregone by dropping the unacceptable option. In addition, the experimenter (under the guise of the friend) made it very clear to the participant in the introduction to the choice matrix that it definitely had to be a pocket-sized model. Any other model *would be truly unacceptable*, and thus *should not be the participant's final choice no matter what else it had to offer*. Might this rather blatant instruction have created a demand effect, in the sense that participants felt they were expected to immediately prune the medium-sized camera from the decision structure, together with the further information it contains, and thus not to look at the reliability and resolution levels of the unacceptable decoy?

Perhaps the above issues could be remedied by another operationalization using a buy for oneself task and a less explicit unacceptability instruction[13], still making sure that the unacceptable status is not idiosyncratically defined across participants and clear from the beginning. For example, see the possible operationalization in figure 8: (1) this operationalization asks participants to imagine having found themselves a flat to live in while studying at the university. A floor plan of the flat is included, showing some missing pieces of furniture and appliances (e.g., a refrigerator). Participants are subsequently asked to go shopping for these items. This portrays a realistic situation for the subject pool (i.e., students); (2) a less explicit unacceptability instruction is realized by including the floor plan, showing size constraints for

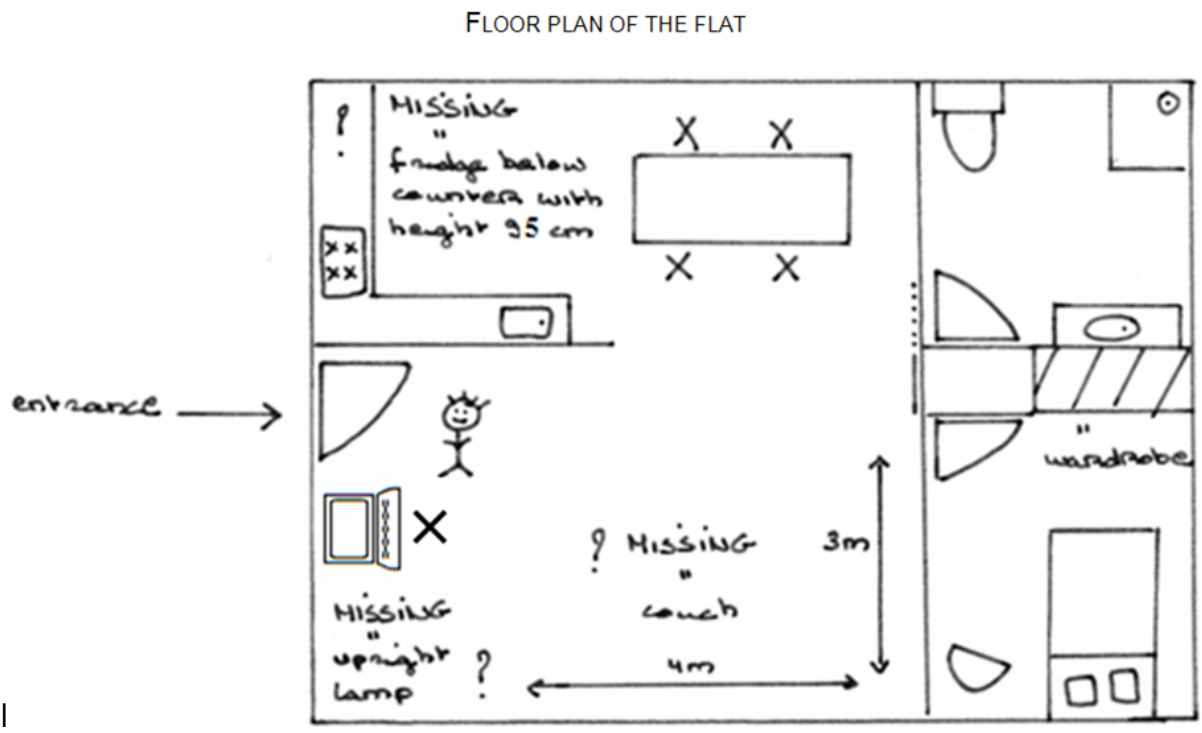
[13] This would make the task less mechanical, automatic, and artificial.

some of the missing pieces (e.g., the refrigerator has to fit below a counter with a height of 95 cm, implying that a refrigerator with a height of 100 cm will be truly unacceptable). Words such as "truly unacceptable" and "constraint" will not be part of the introduction to minimize the chance of participants showing a possible demand effect as detailed above. It is up to the participants to take the size constraint into account at the moment they are deciding between the different refrigerators in the choice table. This is thought to be a common practice in daily life. To further reduce the potential transparency of the task, the product categories couch and standing lamp are included as filler items (next to the refrigerator) (Sen and Johnson 1997). These items are also missing in the flat and need to be bought, with the floor plan specifying size constraints for the couch. An additional advantage of using the floor plan is increasing the participants' imagery with regard to the experimental task; (3) showing the counter's height on the floor plan, in combination with the inclusion of a particular size level in the choice matrix, implies that the refrigerator's unacceptability is not idiosyncratically defined; and finally (4) the floor plan defining the refrigerator's maximum height (turning height into a rejection inducing dimension) and the choice matrix showing the height attribute on the left assure the option's unacceptability is clear from the beginning.

After making choices within the three categories couch, refrigerator and standing lamp, the questionnaire would be very similar to the one used in study 3, with a focus on the refrigerator choice: funnel debriefing task, attribute first looked at for refrigerator C (e.g., "height", "reliability", "energy efficiency", "don't know anymore"), and attribute levels treated as truly unacceptable while choosing. A question checking for a possible demand effect could be added: "Do you think the experimenter expected you to make your choice in a specific fashion?" If the answer is "yes", they will be asked to describe in what fashion (Fitzsimons and Shiv 2001).

Figure 8: Alternative operationalization – Buy for oneself and less blatant unacceptability instruction

Imagine you have found yourself a flat to live in while studying at the university and that the floor plan of your flat is below. Notice that some pieces of furniture and appliances are still missing: a couch, a refrigerator and an upright lamp.



Another issue that could be addressed in future research concerns the effects of the degree of elaboration participants engaged in. The initial comparisons of the relative choice shares in table 10 showed an increasing trend when adding to the two-option set a decoy experienced as unacceptable by the decision maker and making the target a dominating option. No effect, or even a downward trend, seemed present for an unacceptable decoy making the target a compromise option. How might this discrepancy be understood? Might an nonconscious process be active in the asymmetric dominance setting, and a correction process in the compromise setting? A factor crucial in making this distinction is "cognitive elaboration", as an increase in elaboration has been shown to result in an increase of the bias when the under-

lying process is believed to be a nonconscious one (Fitzsimons et al. 2002; Fitzsimons and Shiv 2001; Sen and Johnson 1997) and in a decrease of the bias following several models of bias correction, for example Martin's set-reset approach (1986) and Schwarz and Bless' inclusion-exclusion model (1992). These models argue that people tend to engage in a two-stage process, the first stage being associated with "uncorrected" and lower effort default outcomes and the second stage with more effortful "corrected" outcomes. Martin (1986) argued that when individuals take the task seriously, they assess not only their immediate reaction to a stimulus but also the factors that shape that immediate reaction. If the individual identifies a contextual cue as a factor in their reaction and believes that the contextual cue is inappropriately biasing their genuine reaction, a motivated individual will reset their judgment away from the influence of the cue.

A procedure used to increase the level of cognitive elaboration is telling participants before making their choice that there will be a justification task later in the study (Webster, Richter, and Kruglanski 1996). The current experiment included a scale intended to measure the level of process accountability induced by the agent task (Zhang and Mittal 2005) that was reduced to a single item ("I believed that I would have to explain the process of choosing to my friend") because of a rather disappointing Cronbach alpha (.578). A logistic regression analysis was run including the decoy type x process accountability term, with the decoy type term defined as "unacceptable, asymmetric dominance" setting versus "unacceptable, compromise" setting[14]. This interaction term was significant ($\chi^2(3) = 12.49$, $p < .01$), and the nature of the relationship is visualized in figure 9. In the asymmetric dominance context, the

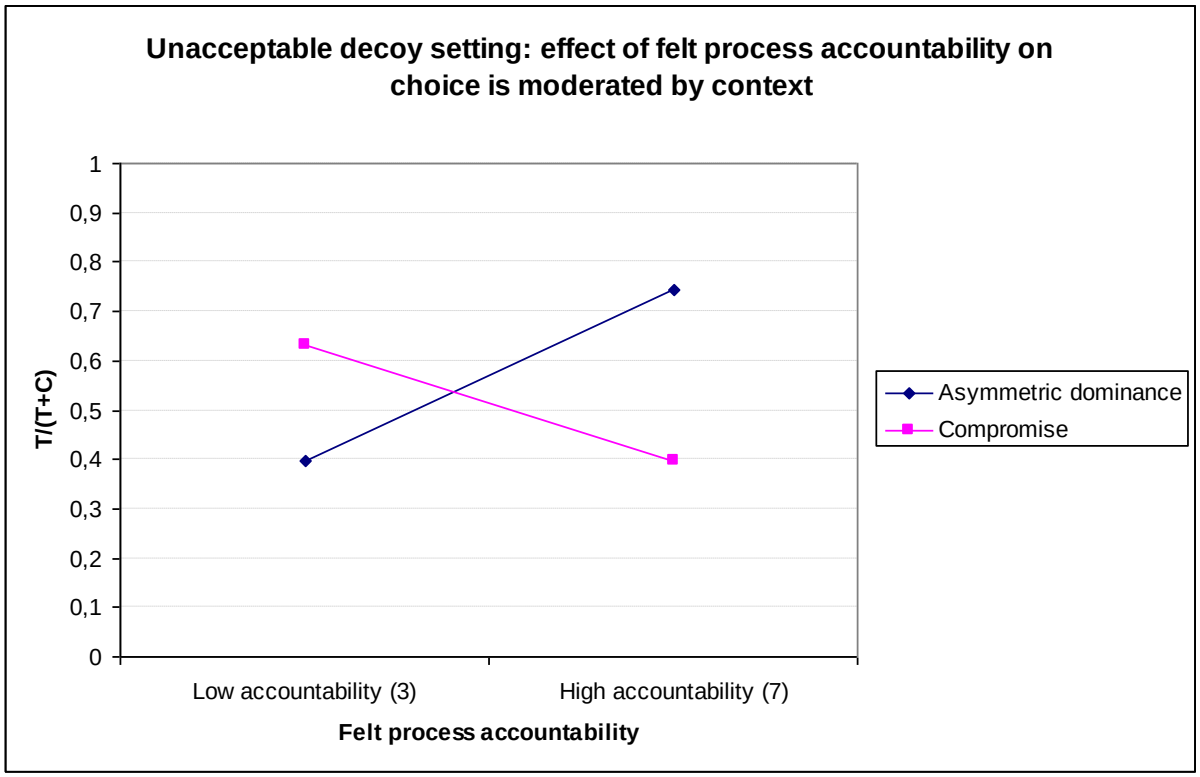
[14] The black unacceptable and red unacceptable decoy conditions were pooled together as the additional emphasis did not alter how increased accountability affected the target share for both contexts ($\chi^2(7) = 13.15$, $p_{\text{decoy type x process accountability x emphasis}} = .835 > .10$).

In the no decoy condition, no relationship was found between process accountability and the target share ($\chi^2(1) = .212$, $p = .646 > .10$).

contaminative effect of the unacceptable option is significantly enhanced for an increasing accountability level ($p_{\text{process accountability term}} = .01$, $b = .370$). In the compromise setting, this effect is marginally significantly attenuated ($p_{\text{process accountability term}} = .08 < .10$, $b = -.237$). These findings are quite suggestive and are consistent with the notion that asymmetric dominance is a more perceptual, automatic process and compromise a more conscious process, as concluded in earlier research (e.g., Dhar and Simonson 2003). However, these findings have to be treated with caution, because the initial idea is based on trends in target share only, a single item measure is used to operationalize process accountability, and the sample size is rather small.

When performing an additional study using the floor plan operationalization (to reduce a possible demand effect), a cognitive elaboration manipulation (e.g., the introduction to the choice task guarantees confidentiality versus mentions the presence of a justification task later on in the study; Simonson 1989; Tetlock, Lerner, and Boettger 1996) could be included to shed additional light on the underlying process. A differential effect of increasing accountability on the target share for both contexts (i.e., asymmetric dominance and compromise) in the case of an unacceptable decoy would then point to the influence of the unacceptable option on the final choice running through a nonconscious process or not depending upon how the decoy adds to the final choice context (i.e., the type of relationships it creates between the options in the set).

Figure 9: Process accountability causing an increase or a decrease of the bias depending on the context relationship defined by the unacceptable option



CHAPTER IV :

SUMMARY AND OVERALL DISCUSSION

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IV.1 SUMMARY

In many situations consumers engage in a phased narrowing of choice options, editing out options that fail to meet some acceptable criteria. Intuition would suggest that once an option has been edited out of the choice set, it should not have any impact on subsequent choices. For the case of well-known context effects such as asymmetric dominance and compromise, however, study 1 shows that the presence of a truly unacceptable option in the choice set influences the final choice between the remaining options. That is, the presence of a truly unacceptable option in the set (e.g., a digital photo camera without a CE label) biases the consumer's final choice by affecting the perceived context within which the final choice is made. The information on the continuous attributes (e.g., reliability and resolution) characterizing the unacceptable option is responsible for this altering of the perceived context. Study 2 focuses on reducing the unacceptable option's contaminating effect on final choice (for the asymmetric dominance setting), attempting to trigger a correction process by making the option's unacceptability more salient in the set. Participants are asked to mark truly unacceptable levels and corresponding options in an initial phase, and they subsequently make a choice within a set still listing the screened out option(s) with the unacceptable level(s) in red and marked with a red asterisk. Only a moderate correction of the unacceptable's influence is found.

In combination, studies 1 and 2 suggest that the presence of a truly unacceptable option in the choice set affects the final choice between the remaining alternatives, and that even

drawing people's attention to the option's unacceptable status does not seem to nullify its effect (perhaps suggesting a nonconscious process). Study 3 provides a stronger test of the unacceptable option's effect by making the unacceptable status clear from the beginning, so that individuals do not have to process values other than the unacceptable aspect before finding this out. In addition, unacceptability was no longer idiosyncratic across participants (in studies 1 and 2 it was up to the participant to define whether the absence of the CE label[15] was truly unacceptable or not). For this an agent task was introduced: participants were asked to imagine that they had been asked by their best friend to buy him/her a digital photo camera, with the friend listing demands (e.g., "I definitely want a pocket-sized model. Any larger or smaller model is truly unacceptable to me, so I don't want you to buy such a camera for me no matter what else it has to offer") and preferences (e.g., "The higher the camera's reliability, the better") with regard to the camera. The friend's demand[16] in combination with the medium size level in the choice matrix determined whether the option was truly unacceptable or not. In addition, the introduction of a constraint on the size attribute only, together with its left position in the choice matrix, assured it was the first attribute focused on during the choice process. Under these more stringent conditions an effect of the unacceptable option on the subsequent choice was no longer found (this holds for both the asymmetric dominance and the compromise setting). One simple explanation would be that participants did not look at the values other than the unacceptable aspect. When keeping in mind that study 3's operationalization, as opposed to that of study 1, was precisely aimed at making the decoy option's unacceptability clear from the outset so that participants would not have to process values

[15] The CE label was varied across conditions: the presence of the CE label in the set made the camera acceptable, whereas the absence of the label made it truly unacceptable, but only if experienced as such by the participant. See appendices 2 and 3.

[16] The demand was varied across conditions: "I definitely want a pocket-sized model" made the medium-sized model truly unacceptable; "I definitely want a pocket- or medium-sized model" made the medium-sized model acceptable. See appendix 11.

other than the unacceptable aspect before finding this out, this explanation seems particularly tenable. Unfortunately, to the extent that people did not look at the other attribute values, the funnel debriefing task included to examine the nonconscious process idea and the red unacceptable level introduced to increase the awareness of a possible bias due to the unacceptable option and lead to correction become less useful.

However, the operationalization of study 3 may have been too restrictive. Because of the agent task the participant had to buy a specific digital photo camera for a friend and not for oneself, and as a consequence might have been more cognitively lazy and less curious as to what is foregone. In addition, the rather blatant instructions given by the experimenter (under the guise of the friend) with regard to the camera's size level (using terms such as "truly unacceptable to me", "don't want you to buy such a camera", and "no matter what else it has to offer") might have created a demand effect. That is, participants might have felt they were expected to immediately prune the medium-sized camera from the decision structure, together with the further information it contains, and thus not to look at the reliability and resolution levels of the unacceptable decoy.

The above issues could be resolved in a future study, using a buy for oneself task and a less explicit unacceptability instruction, still making sure that the unacceptable status is clear from the beginning and not idiosyncratically defined across participants. Perhaps under these modified conditions participants (even though the option's unacceptability is clear up front) still process the values other than the unacceptable aspect, leading to an effect of the unacceptable option on the subsequent choice. For example, the participants may be asked to buy some pieces of furniture and appliances (e.g., a refrigerator) for a flat they have rented, taking the floor plan of the flat into account. This plan shows among other things that the refrigerator has to fit below a counter with a certain height. Thus, a refrigerator exceeding this height will

be truly unacceptable. Words such as "truly unacceptable" and "constraint" will not be part of the introduction to minimize the chance of participants showing a possible demand effect as detailed above. It is up to the participants to take the size constraint into account at the moment they are deciding between the different refrigerators in the choice table. This is thought to be a common practice in daily life.

In addition to a modified unacceptability operationalization, a future study could manipulate the level of cognitive elaboration participants engage in. The trends in target share found in study 3 show (1) an increase when adding to the two-option set a decoy experienced as unacceptable by the decision maker and making the target a dominating option and (2) a status quo, or even a decrease, for an unacceptable decoy making the target a compromise option. The elaboration factor may suggest a nonconscious process being active in the asymmetric dominance setting and a conscious correction process in the compromise setting by showing an increase in the unacceptable option's influence for increasing elaboration in the former setting and a decrease in bias in the latter. This is exactly what study 3 showed, operationalizing the level of elaboration by measuring process accountability as induced by the agent task ("I believed that I would have to explain the process of choosing to my friend"). To further explore this idea of nonconscious versus correction processes being responsible for the possible presence versus absence of an effect of the unacceptable option on final choice depending upon how the unacceptable adds to the final choice context, the level of elaboration could be manipulated in future research. Study 1's finding (when applying the Fisher Exact Test in combination with chi-square statistics) that in the compromise setting the target share is significantly decreased when comparing the unacceptable to the acceptable decoy, whereas no decrease is found for the asymmetric dominance setting, might also fit in with this idea.

Table 11 below gives an overview of factors differing between the several studies, keeping in mind that each of them may have its own implications as to whether the unacceptable option biases the subsequent choice or not.

Table 11: Overview of different operationalizations and procedures used for the different studies

Factor	Study 1	Study 2	Study 3	Future study
Buy for oneself	x	x		x
Buy for a friend			x	
Blatant unacceptability instruction			x	
Unacceptable status is clear from the beginning, so values other than the unacceptable aspect need not be processed before finding this out			x	x
Unacceptable status not idiosyncratically defined across participants			x	x
Unacceptable status is measured after making one's choice (appendices 3 and 12)	x		x	x
Unacceptable status is measured before making one's choice (appendix 7)		x		
Red level included		x	x	x
Funnel debriefing included			x	x
Cognitive elaboration measured (i.e., process accountability)			x	
Cognitive elaboration manipulated (i.e., confidential versus justify ones choice)				x
Asymmetric dominance context included	x	x	x	x
Compromise context included	x		x	x
Unacceptability of decoy varied in choice matrix (label present versus absent, appendix 2)	x	x		
Unacceptability of decoy varied in introduction to choice matrix (medium-sized camera defined by the friend as truly unacceptable or not, appendix 11; varying the counter's height in the floor plan)			x	x
Number of product categories presented to the same participant	11	1	1	3

IV.2 Overall Discussion

The starting point of this dissertation was whether the presence of a truly unacceptable option influences the final choice between the remaining options in the set by adding to the final choice context. Studies 1 to 3 suggest that an answer to this question is dependent upon (1) the percentage of participants still looking at values other than the unacceptable aspect, if the unacceptability is communicated up front and (2) *how* the unacceptable adds to the final choice context (making the target a dominating or a compromise option), perhaps operating through either a nonconscious or a correction process. This dependence limits the potential impact of the unacceptable option on decision making.

In the literature traits can be found showing a possible relationship with whether or not values other than the unacceptable aspect are processed. Examples include the curiosity and exploration inventory developed by Kashdan, Rose and Fincham (2004) (with items such as "I would describe myself as someone who activily seeks as much information as I can in a new situation" and "I am not the type of person who probes deeply into new situations or things") and the need for closure scale, with people characterized by a low (high) concern about closure showing more (less) processing of these other values (Kardes et al. 2004; Kruglanski and Webster 1996). One of the five need for closure factors that seems particularly interesting is the decisiveness facet (containing items such as "I would describe myself as indecisive" and "I tend to struggle with most decisions"; Neuberg, Jeudice, and West 1997). These traits may be included in future research as moderators of the relationship between the truly unacceptable option and the final choice made within the set.

If made clear from the beginning that the option is truly unacceptable, this option's values other than the unacceptable aspect may be looked at swiftly or even nonconsciously. As mentioned by Chartrand (2005), in the context of her model of automatic processes, the con-

sumer may not be consciously noting the environmental trigger. In addition, a vast body of literature exists around the concept of unconscious perception, defined by Merikle and Joordens (1997) as "perceiving information even when we do not have the subjective experience of perceiving." This information perceived without awareness has also been shown to bias what stimuli are perceived with awareness and to influence how stimuli perceived with awareness are consciously experienced (see article by Merikle, Smilek, and Eastwood 2001 for examples in the psychological field). Treisman's filter-attenuation theory (1960) (see Merikle and Joordens (1997) for a detailed discussion of this theory) further supports possible interference of unconsciously perceived stimuli with ongoing intentional actions. This reasoning would make it possible for the unacceptable option to still impact subsequent choice even if the decision maker does not show thorough processing of the levels other than the unacceptable aspect.

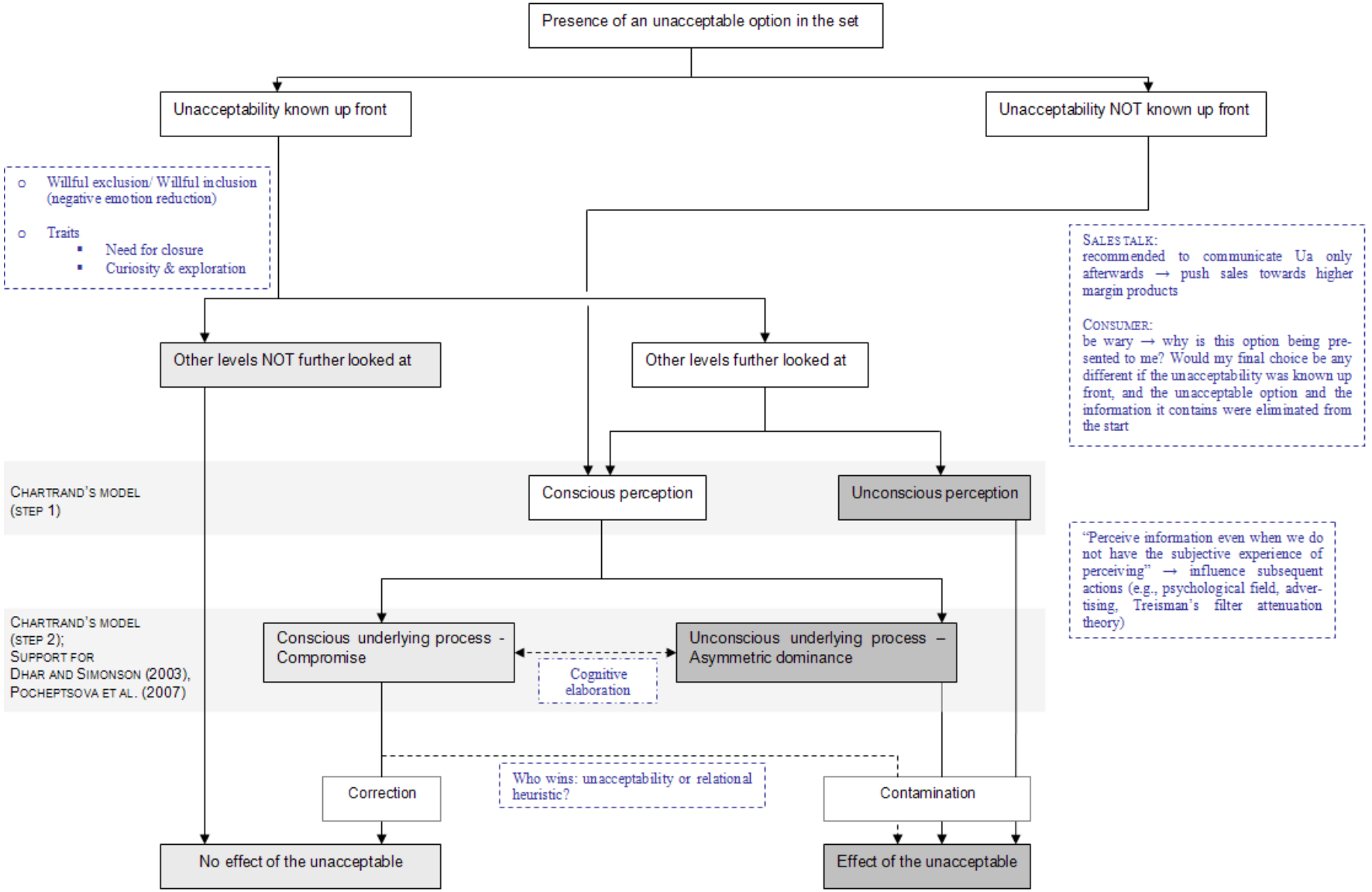
Although making the unacceptable status clear from the beginning offers a stronger test of the unacceptable option's effect, one could argue in favor of this status often not being clear up front. In real life, situations may exist where the option is known to be unacceptable only afterwards (i.e., in a later stage of the decision making process): in a sales talk the salesperson may delay the discussion of rejection inducing dimensions such as the price or the size of a refrigerator (as such trying to influence the consumer's final choice). Also, if buying a less familiar product, the consumer may gather information on all the available attributes, learning only afterwards what dimensions may lead to rejection of an option no matter what else it has to offer. In such situations the impact of the unacceptable option is expected to be larger.

The (provisional) finding that the unacceptable affects the final choice through a more conscious or nonconscious process depending upon how it adds to the final choice context

(making the target a compromise or a dominating option) gives additional support to the notion that compromise is a more conscious process, and asymmetric dominance a more perceptual, automatic process, as concluded in earlier research (Dhar and Simonson 2003).

In sum, whether unacceptable options affect further decision making is dependent upon factors such as whether the unacceptable status is clear from the beginning, whether values other than the unacceptable aspect are examined further (perhaps unconsciously), and whether the type of relationship defined between the options in the set by the addition of the unacceptable option causes the underlying process to be conscious or not, thus leading to a correction or a continuation of the unacceptable option's effect (figure 10). Hopefully, the knowledge gathered in this dissertation leads to a more integrated framework for the role of unacceptable options in decision making, with the suggestions for future research being a next step in this direction.

Figure 10: Overview of factors causing the presence or absence of an effect of the truly unacceptable option on subsequent choice



APPENDICES

APPENDICES

APPENDIX 1:

STUDY 1 – DEFINITION OF THE LABELS

CE label: CE stands for Conformité Européene. Buying a product WITHOUT the CE label on the EU market is illegal, and use of it may be unhealthy (e.g., harmful radiation), unsafe (e.g., explosion danger), or dangerous for the environment. On the other hand, a product that is marked WITH the CE label conforms with all the health, safety and environmental protection standards of the European Union (relating to the consumer). It is therefore eligible to be sold within the countries of the EU.

GMI label: Made with GMI stands for "Made with Genetically Modified Ingredients". Within the EU market labelling concerning genetically modified ingredients is introduced (Regulation EC no. 1830/2003, issued by the European Parliament and the Council of 22 september 2003). Cornflakes WITH the "Made with GMIs" label will contain genetically modified ingredients. These genetic alterations may include viral and insect resistance, increased yields, and enhanced shelf life. Cornflakes WITHOUT the "Made with GMIs" label will not contain genetically modified ingredients.

EU flower label: stands for the European eco-label. Within the EU market the EU flower is introduced, which is supervised by the European Union Eco-labelling Board. This board is composed of different stakeholders: competent bodies of the member states, representatives from environmental NGOs, from consumer and industry associations, from trade unions, and observers from other countries. Printer paper WITH the "EU flower" label assures customers that the wood used in the product was harvested in an environmentally responsible way that maintains the sustainability of the forest and preserves wildlife and forest ecosystems. Printer paper WITHOUT the "EU flower" label means that the product comes from forests that aren't managed in an environmentally friendly manner.

Cleanliness label (linked to restaurant): Clean Liness A restaurant WITHOUT the "Cleanliness" label has obtained a bad rating by the restaurant inspection committee regarding

the overall cleanliness of the restaurant, and this relates to the dining room ánd the cooking area. A restaurant WITH the "Cleanliness" label on the other hand has been favourably evaluated by the committee on the cleanliness of the dining room and the cooking area.

Cleanliness label (linked to overnight accommodation): Clean Liness An establishment WITHOUT the "Cleanliness" label has obtained a bad rating by Michelin, and thus does not offer clean accomodation (and this relates to bedroom, private facilities, eating area and kitchen). An accomodation WITH the "Cleanliness" label on the other hand, has been favourably evaluated by Michelin concerning the overall cleanliness of the accommodation.

FireSafety label:  Renting a room WITHOUT the "FireSafety" label indicates a problem regarding the presence of smoke-fire detection and/or of a second escape route (e.g., no escape ladder, no flat roof), and/or of the fire extinguisher (e.g., not present on each floor, no yearly check-up). On the other hand, renting a student room WITH the "FireSafety" label conforms to the standards of Fire Department, and shows no problems regarding the smoke-fire detection, the second escape route and the fire extinguisher.

RoomQuality label:  Renting a room WITHOUT the "RoomQuality" label indicates a problem regarding bad hygiene, mouldy smells, mildew on the walls or insulation. On the other hand, renting a student room WITH the "RoomQuality" label conforms with the standards of the University's Housing Department, and will not lead to hygiene, moisture or insulation problems.

APPENDIX 2:

STUDY 1 – CHOICE MATRIX: NO DECOY, ACCEPTABLE DECOY, BLACK UNACCEPTABLE DECOY

The introduction (i.e., definition of the attributes, market ranges) to each of the three types of choice matrices is identical. The unacceptability of the decoy option is manipulated by the presence/absence of the CE label (see cells with black frame).

Three types of choice matrices:

NO DECOY

Restaurant	Wait staff (friendly, helpful, attentive)	Ambiance/Décor	CleanLiness	Check the restaurant that you would pick for dinner (check only one)
Restaurant N	4.4	59	Yes	□
Restaurant M	3.7	74	Yes	□

ACCEPTABLE DECOY

Restaurant	Wait staff (friendly, helpful, attentive)	Ambiance/Décor	CleanLiness	Check the restaurant that you would pick for dinner (check only one)
Restaurant N	4.4	59	Yes	□
Restaurant M	3.7	74	Yes	□
Restaurant O	3.1	67	Yes	□

BLACK UNACCEPTABLE DECOY

Restaurant	Wait staff (friendly, helpful, attentive)	Ambiance/Décor	CleanLiness	Check the restaurant that you would pick for dinner (check only one)
Restaurant N	4.4	59	Yes	□
Restaurant M	3.7	74	Yes	□
Restaurant O	3.1	67	No	□

APPENDIX 3:

STUDY 1 – UNACCEPTABILITY RATING OF THE LABEL

When choosing between these three restaurants I perceived the ABSENCE OF THE CLEANLINESS LABEL as follows (check only one):

□ Truly unacceptable

(This means you would immediately reject a restaurant without cleanliness label, NO MATTER WHAT ELSE IT HAD TO OFFER)

□ Acceptable, but it had to be off-set by another feature of the restaurant

(This means that you would NOT immediately reject a restaurant without cleanliness label AS LONG AS IT IS ATTRACTIVE ON OTHER ATTRIBUTES (e.g., good ambiance/ appealing décor). Compensation by another feature of the restaurant is thus required to make a restaurant without cleanliness label an acceptable option)

□ Acceptable, but it influenced the degree of preference in a negative way

(This means that you would NOT immediately reject a restaurant without cleanliness label. The absence of the cleanliness label does NOT have to be off-set by another feature of the restaurant to make it an acceptable option, but will CAUSE THE PREFERENCE FOR THAT ALTERNATIVE TO BE LOWER. The presence/absence of the cleanliness label will thus only influence the degree of preference for an alternative that is acceptable anyhow)

□ Irrelevant to my choice

(This means that you would NOT immediately reject a restaurant without cleanliness label. In fact, whether the cleanliness label is present or not leaves you indifferent)

APPENDIX 4:

STUDY 1 – CONTINUOUS ATTRIBUTES AND THEIR LEVELS FOR EACH OF THE 11 PRODUCT CATEGORIES FOR BOTH ASYMMETRIC DOMINANCE AND COMPROMISE[17]

CD PLAYER

($range_{track\ programming}$ = 0-56; $range_{number\ of\ disks}$ = 0-40)

ASYMMETRIC DOMINANCE

CD player	Track programming	Number of disks	CE	Check the CD player that you would buy (check only one)
CD player B	32	4	Yes	□
CD player A	24	10	Yes	□
CD player C	16	8	Yes	□

COMPROMISE

CD player	Track programming	Number of disks	CE	Check the CD player that you would buy (check only one)
CD player B	32	4	Yes	□
CD player A	24	10	Yes	□
CD player D	12	20	Yes	□

[17] Acceptable setting

DIGITAL CAMERA

($range_{storage\ size}$ = 4-192; $range_{optical\ zoom}$ = 0X-10X)

ASYMMETRIC DOMINANCE

Digital camera	Storage size (megabyte)	Optical zoom	CE	Check the digital camera that you would buy (check only one)
Digital camera J	96	2X	Yes	□
Digital camera I	64	3.6X	Yes	□
Digital camera K	32	2.8X	Yes	□

COMPROMISE

Digital camera	Storage size (megabyte)	Optical zoom	CE	Check the digital camera that you would buy (check only one)
Digital camera J	96	2X	Yes	□
Digital camera I	64	3.6X	Yes	□
Digital camera L	16	5.9X	Yes	□

PORTABLE PC

($range_{processor\ speed}$ = 0.8-3.06; $range_{hard\ drive\ capacity}$ = 3.1-110)

ASYMMETRIC DOMINANCE

Portable PC	Processor speed (gigahertz)	Hard drive capacity (gigabyte)	CE	Check the portable PC that you would buy (check only one)
Portable PC b	2.8	20	Yes	□
Portable PC a	2.4	40	Yes	□
Portable PC c	2.2	30	Yes	□

COMPROMISE

Portable PC	Processor speed (gigahertz)	Hard drive capacity (gigabyte)	CE	Check the portable PC that you would buy (check only one)
Portable PC b	2.8	20	Yes	□
Portable PC a	2.4	40	Yes	□
Portable PC d	1.9	65	Yes	□

MICROWAVE

($range_{cooking\ power}$ = 550-1450; $range_{ease\ of\ use}$ = 25-95, scored between 0 and 100 by Consumer Reports)

ASYMMETRIC DOMINANCE

Microwave	Cooking power (watt)	Ease of use	CE	Check the microwave oven that you would buy (check only one)
Microwave n	1050	67	Yes	□
Microwave m	900	77	Yes	□
Microwave o	800	72	Yes	□

COMPROMISE

Microwave	Cooking power (watt)	Ease of use	CE	Check the microwave oven that you would buy (check only one)
Microwave n	1050	67	Yes	□
Microwave m	900	77	Yes	□
Microwave p	650	94	Yes	□

CORNFLAKES

($range_{taste}$ = 45-95, scored between 0 and 100 by Consumer Reports; $range_{calories}$ = 80-260, per serving of 55 gram)

ASYMMETRIC DOMINANCE

Cornflakes	Taste	Calories (cal per serving)	Made with GMI	Check the cornflakes that you would buy (check only one)
Cornflakes F	79	220	No	□
Cornflakes E	71	180	No	□
Cornflakes G	66	200	No	□

COMPROMISE

Cornflakes	Taste	Calories (cal per serving)	Made with GMI	Check the cornflakes that you would buy (check only one)
Cornflakes F	79	220	No	□
Cornflakes E	71	180	No	□
Cornflakes H	60	125	No	□

POTATO CHIPS

(range$_{taste}$ = 40-95, scored between 0 and 100 by Consumer Reports; range$_{calories}$ = 420-1330, per bag of 200 gram)

ASYMMETRIC DOMINANCE

Potato chips	Taste	Calories (cal per bag)	Made with GMI	Check the potato chips that you would buy (check only one)
Potato chips V	91	1020	No	□
Potato chips U	82	870	No	□
Potato chips W	76	945	No	□

COMPROMISE

Potato chips	Taste	Calories (cal per bag)	Made with GMI	Check the potato chips that you would buy (check only one)
Potato chips V	91	1020	No	□
Potato chips U	82	870	No	□
Potato chips X	69	653	No	□

RESTAURANT

(range$_{wait\ staff}$ = 0-5, based on five-point scale taken from restaurant evaluation study; range$_{ambiance/décor}$ = 10-100, based on 100-point scale taken from restaurant evaluation study)

ASYMMETRIC DOMINANCE

Restaurant	Wait staff (friendly, helpful, attentive)	Ambiance/Décor	CleanLiness	Check the restaurant that you would pick for dinner (check only one)
Restaurant N	4.4	59	Yes	□
Restaurant M	3.7	74	Yes	□
Restaurant O	3.1	67	Yes	□

COMPROMISE

Restaurant	Wait staff (friendly, helpful, attentive)	Ambiance/Décor	CleanLiness	Check the restaurant that you would pick for dinner (check only one)
Restaurant N	4.4	59	Yes	□
Restaurant M	3.7	74	Yes	□
Restaurant P	2.6	97	Yes	□

OVERNIGHT ACCOMMODATION

(range$_{décor/character}$ = 40-90, scored between 0 and 100 by Michelin; range$_{distance\ to\ places\ worth\ visiting}$ = 0-70)

ASYMMETRIC DOMINANCE

Overnight accomm.	Décor/character	Distance to places worth visiting (minutes using public transport)	Clean Liness	Check the overnight accomm. that you would pick (check only one)
Overnight accomm. j	85	36	Yes	☐
Overnight accomm. i	77	24	Yes	☐
Overnight accomm. k	72	30	Yes	☐

COMPROMISE

Overnight accomm.	Décor/character	Distance to places worth visiting (minutes using public transport)	Clean Liness	Check the overnight accomm. that you would pick (check only one)
Overnight accomm. j	85	36	Yes	☐
Overnight accomm. i	77	24	Yes	☐
Overnight accomm. l	66	8	Yes	☐

STUDENT ROOM

(range$_{distance\ to\ campus}$ = 0.5-74; range$_{size}$ = 9-28)

ASYMMETRIC DOMINANCE

Student room	Distance to campus (minutes of walking)	Size (m^2)		Check the student room that you would pick (check only one)
Student room R	11	16.1	Yes	☐
Student room Q	25	19.2	Yes	☐
Student room S	31	17.6	Yes	☐

COMPROMISE

Student room	Distance to campus (minutes of walking)	Size (m^2)		Check the student room that you would pick (check only one)
Student room R	11	16.1	Yes	☐
Student room Q	25	19.2	Yes	☐
Student room T	44	23.5	Yes	☐

PAPER TOWEL

(range$_{strength}$ = 20-95, scored between 0 and 100 by Consumer Reports; range$_{absorption}$ = 35-96, scored between 0 and 100 by Consumer Reports)

ASYMMETRIC DOMINANCE

Paper towel	Strength	Absorption		Check the paper towel that you would buy (check only one)
Paper towel f	91	70	Yes	☐
Paper towel e	78	80	Yes	☐
Paper towel g	71	75	Yes	☐

COMPROMISE

Paper towel	Strength	Absorption		Check the paper towel that you would buy (check only one)
Paper towel f	91	70	Yes	☐
Paper towel e	78	80	Yes	☐
Paper towel h	60	94	Yes	☐

PRINTER PAPER

(range$_{weight}$ = 80-160; range$_{brightness}$ = 55-95, scored between 0 and 100 by Consumer Reports)

ASYMMETRIC DOMINANCE

Printer paper	Weight (g/m^2)	Brightness		Check the printer paper that you would buy (check only one)
Printer paper r	115	73	Yes	☐
Printer paper q	100	79	Yes	☐
Printer paper s	90	76	Yes	☐

COMPROMISE

Printer paper	Weight (g/m^2)	Brightness		Check the printer paper that you would buy (check only one)
Printer paper r	115	73	Yes	☐
Printer paper q	100	79	Yes	☐
Printer paper t	80	87	Yes	☐

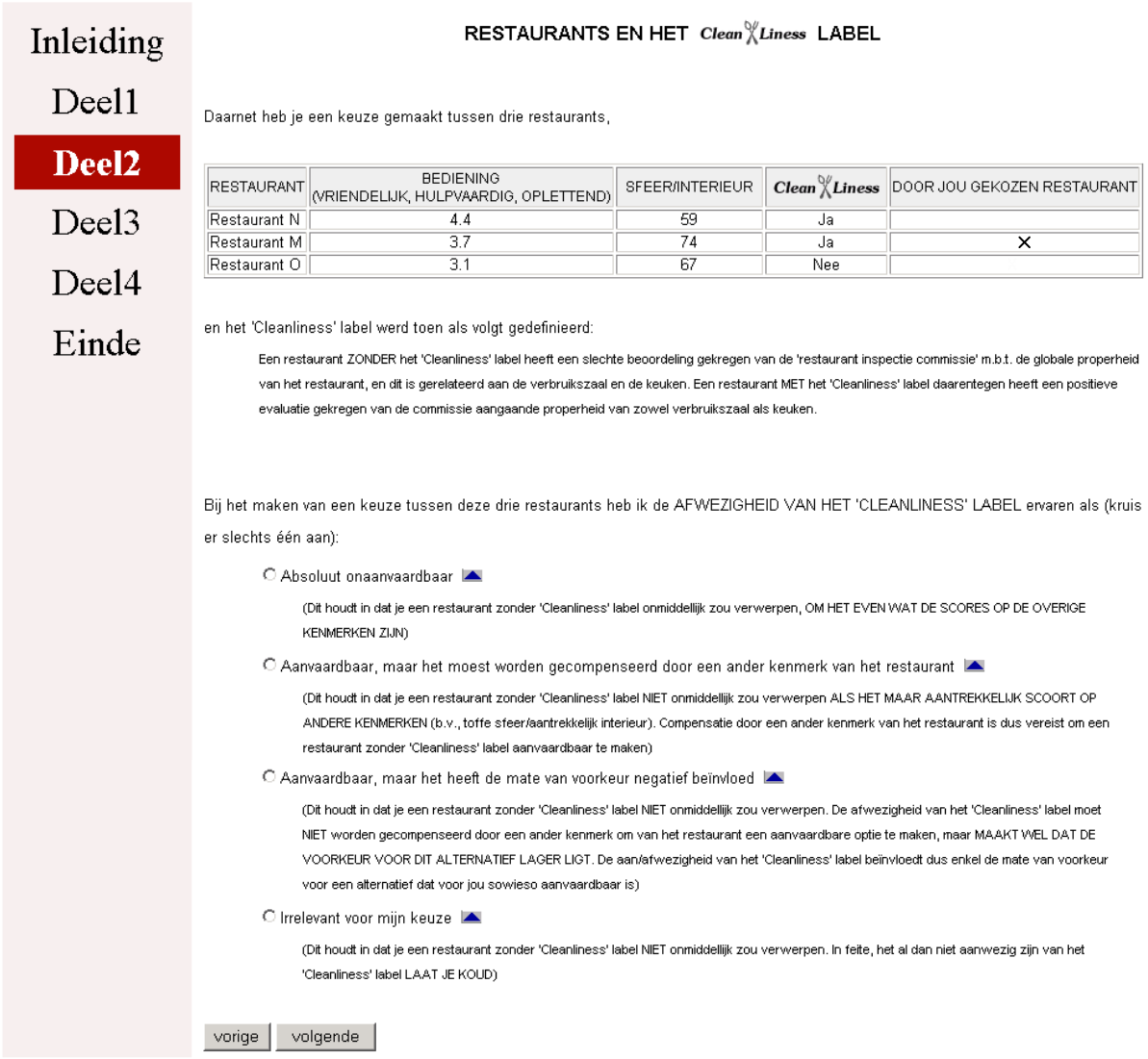
APPENDIX 5:

STUDY 1 – SCREENSHOTS

SCREENSHOT RESTAURANT CHOICE: DESCRIPTION OF ATTRIBUTES AS IN SURVEY

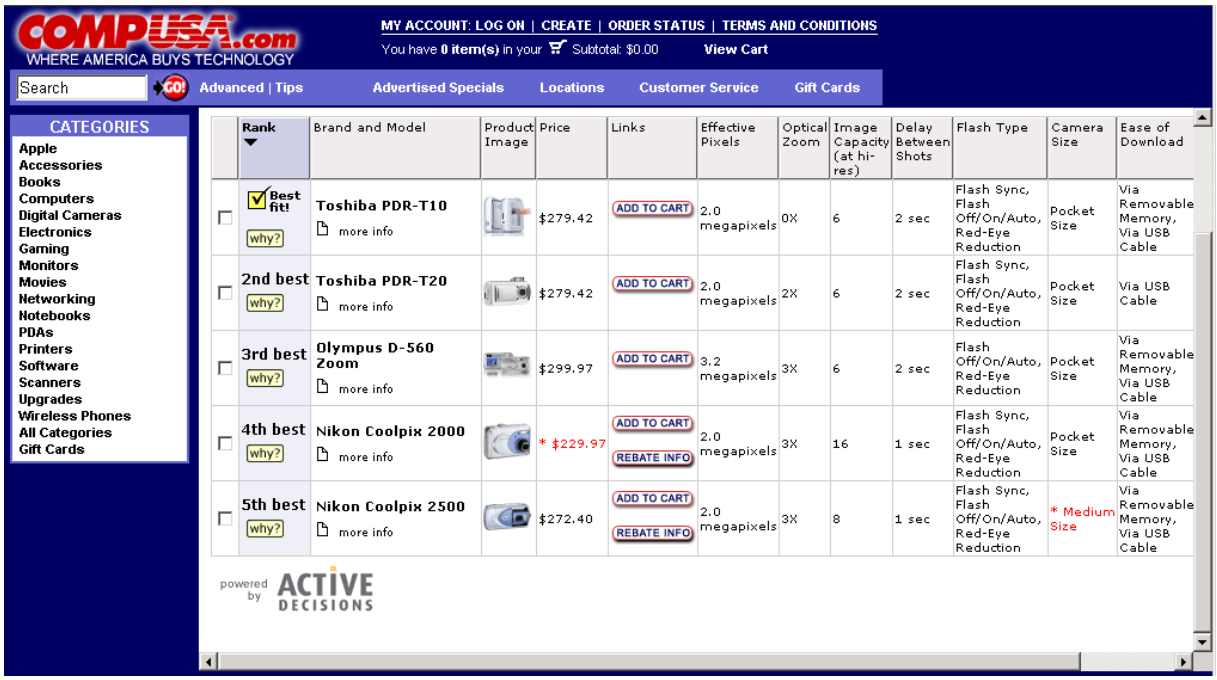
SCREENSHOT RESTAURANT CHOICE: CHOICE MATRIX, INCLUDING ABSENCE OF CLEANLINESS LABEL

SCREENSHOT RESTAURANT CHOICE: ASSESSING THE LABEL'S UNACCEPTA-BILITY



APPENDIX 6:

PRESENTATION OF A TRULY UNACCEPTABLE OPTION WITH RED LEVELS IN A CHOICE MATRIX: COMPUSA.COM (REAL LIFE EXAMPLE)



APPENDIX 7:

STUDY 2 – UNACCEPTABILITY RATING OF THE ATTRIBUTE LEVELS IN THE CHOICE MATRIX

Restaurants probably exist that you would NEVER EVEN CONSIDER VISITING because of the presence of TRULY UNACCEPTABLE scores? An attribute level is "truly unacceptable" if you would IMMEDIATELY reject a restaurant with that level, NO MATTER how it scores on the OTHER attributes (e.g., a microwave oven which measures widthwise 45 centimeters, whereas your kitchen can accommodate one of only 30 centimeters is immediately rejected, no matter how it scores on the other attributes).

Below a table will be shown, including different alternatives and how they score on the attributes wait staff, ambiance/décor and cleanliness. Please mark truly unacceptable scores in columns 2 to 4, ánd the corresponding truly unacceptable alternatives in column 5. Notice that you are FREE TO INDICATE ANY NUMBER of unacceptable levels per option and free to mark any number of options as being truly unacceptable, INCLUDING NONE AT ALL.

	1. Check the scores that are truly unacceptable to you (free to mark 0, 1, 2 or 3 levels per option)			
Restaurant	Wait staff (friendly, helpful, attentive)	Ambiance/Décor	Cleanliness	**2.** Mark the restaurants you would never even consider visiting (free to mark 0, 1, 2 or 3 options)
Restaurant N	4.4 ☐	59 ☐	Yes ☐	☐
Restaurant M	3.7 ☐	74 ☐	Yes ☐	☐
Restaurant O	3.1 ☐	67 ☐	No ☒	☒

APPENDIX 8:

STUDY 2 – CHOICE MATRIX: RED UNACCEPTABLE DECOY

Restaurant	Wait staff (friendly, helpful, attentive)	Ambiance/Décor	CleanLiness	Check the restaurant that you would pick for dinner (check only one)
Restaurant N	4.4	59	Yes	☐
Restaurant M	3.7	74	Yes	☐
Restaurant O	3.1	67	* No	☐

* red means the score is TRULY UNACCEPTABLE to you

APPENDIX 9:

STUDY 2 – CONTINUOUS ATTRIBUTES AND THEIR LEVELS FOR EACH OF THE TWO PRODUCT CATEGORIES FOR ASYM-METRIC DOMINANCE[18]

RESTAURANT

($range_{wait\ staff}$ = 0-5, based on five-point scale taken from restaurant evaluation study; $range_{am-biance/décor}$ = 10-100, based on 100-point scale taken from restaurant evaluation study)

ASYMMETRIC DOMINANCE

Restaurant	Wait staff (friendly, helpful, attentive)	Ambiance/Décor	CleanLiness	Check the restaurant that you would pick for dinner (check only one)
Restaurant N	4.4	59	Yes	□
Restaurant M	3.7	74	Yes	□
Restaurant O	3.1	67	No	□

PORTABLE PC

($range_{processor\ speed}$ = 0.8-3.06; $range_{hard\ drive\ capacity}$ = 3.1-110)

ASYMMETRIC DOMINANCE

Portable PC	Processor speed (gigahertz)	Hard drive capacity (gigabyte)	CE	Check the portable PC that you would buy (check only one)
Portable PC b	2.8	20	Yes	□
Portable PC a	2.4	40	Yes	□
Portable PC c	2.2	30	No	□

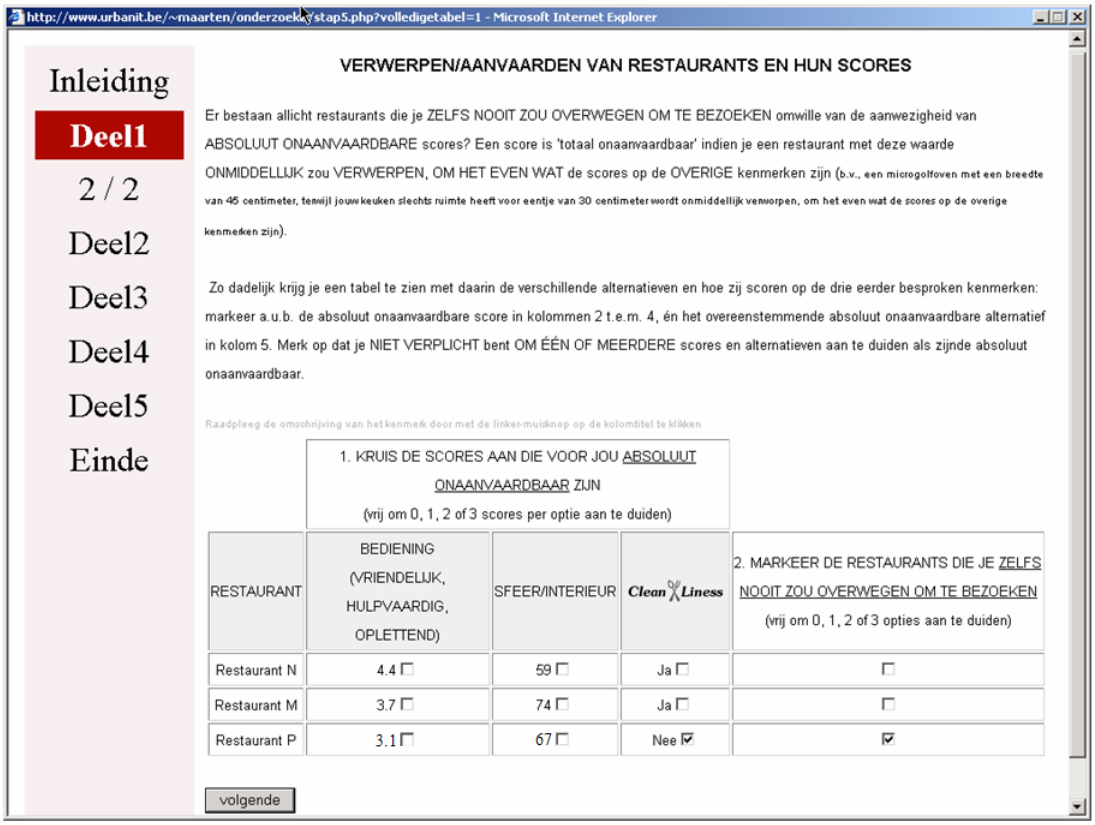
[18] Unacceptable setting

APPENDIX 10:

STUDY 2 – SCREENSHOTS

SCREENSHOT RESTAURANT CHOICE: ASSESSING THE LEVELS' UNACCEPTA-

BILITY



SCREENSHOT RESTAURANT CHOICE: CHOICE MATRIX, ABSENCE OF CLEANLINESS LABEL PRINTED IN RED

APPENDIX 11:

STUDY 3 – CHOICE MATRIX: NO DECOY, ACCEPTABLE DECOY, BLACK UNACCEPTABLE DECOY, RED UNACCEPTABLE DECOY

The introduction (i.e., definition of the attributes, market ranges) to each of the different types of choice matrices is identical. The unacceptability of the decoy option is manipulated by whether the friend defines a medium-sized camera as truly unacceptable or not at the outset of the experiment (see black frames in the text below).

Specification of the best friend's demands and preferences:

NO DECOY – BLACK UNACCEPTABLE DECOY – RED UNACCEPTABLE DECOY

Imagine a close friend has asked you to buy him/her a digital photo camera. You agree, and listen very carefully to the DEMANDS AND PREFERENCES put forward by your friend with regard to the camera:

> *"Well, I want you to buy me a digital photo camera. I definitely want a pocket-sized model. Any larger (medium- or SLR-size) or smaller (watch-size) model is truly unacceptable to me, so I don't want you to buy such a camera for me no matter what else it has to offer. Furthermore, the higher the camera's reliability and resolution, the better."*

ACCEPTABLE DECOY

Imagine a close friend has asked you to buy him/her a digital photo camera. You agree, and listen very carefully to the DEMANDS AND PREFERENCES put forward by your friend with regard to the camera:

> *"Well, I want you to buy me a digital photo camera. I definitely want a pocket- or medium-sized model. Any larger (SLR-size) or smaller (watch-size) model is truly unacceptable to me, so I don't want you to buy such a camera for me no matter what else it has to offer. Furthermore, the higher the camera's reliability and resolution, the better."*

Four types of choice matrices:

NO DECOY

Digital camera	Size	Reliability	Resolution (megapixels)	Check the digital camera that you would buy (check only one)
Digital camera A	Pocket	14.40	7.60	☐
Digital camera B	Pocket	16.60	5.40	☐

ACCEPTABLE DECOY – BLACK UNACCEPTABLE DECOY

Digital camera	Size	Reliability	Resolution (megapixels)	Check the digital camera that you would buy (check only one)
Digital camera A	Pocket	14.40	7.60	☐
Digital camera B	Pocket	16.60	5.40	☐
Digital camera C	Medium	18.05	3.95	☐

RED UNACCEPTABLE DECOY

Digital camera	Size	Reliability	Resolution (megapixels)	Check the digital camera that you would buy (check only one)
Digital camera A	Pocket	14.40	7.60	☐
Digital camera B	Pocket	16.60	5.40	☐
Digital camera C	* Medium	18.05	3.95	☐

* red means the camera is truly unacceptable to you, as it does not meet your friend's camera size requirements

APPENDIX 12:

STUDY 3 – UNACCEPTABILITY RATING OF THE ATTRIBUTE LEVELS IN THE CHOICE MATRIX

At the outset of this study you have chosen a digital photo camera for your friend out of a set of three. Please try to relive this moment while answering the following question.

While choosing you might have treated one or more of the attribute levels in the choice table as truly unacceptable. A level is defined as "truly unacceptable" if it is so disliked that "if a camera has it, you would immediately reject it as an alternative, *no matter what else it has to offer"*.

Below the attribute levels are shown as presented in the initial choice table. Please mark those levels that you perceived as "*truly unacceptable"* while choosing the best possible buy for your friend. Note that you are *free to indicate any number of levels (max. 9), including none at all.*

☐ Pocket	☐ 14.40	☐ 7.60
☐ Pocket	☐ 16.60	☐ 5.40
☐ Medium	☐ 18.05	☐ 3.95

APPENDIX 13:

STUDY 3 – CONTINUOUS ATTRIBUTES AND THEIR LEVELS FOR THE DIGITAL PHOTO CAMERA CATEGORY FOR BOTH ASYMMETRIC DOMINANCE AND COMPROMISE

DIGITAL PHOTO CAMERA

($range_{size}$ = watch-size, pocket-size, medium-size, SLR-size ; $range_{reliability}$[19] = 11-20, scored on a 20-point scale by Consumer Reports; $range_{resolution}$[20] = 2-11)

ASYMMETRIC DOMINANCE

Digital photo camera	Size	Reliability	Resolution (megapixels)	Check the digital photo camera that you would buy (check only one)
Digital photo camera A	Pocket	14.40	7.60	□
Digital photo camera B	Pocket	16.60	5.40	□
Digital photo camera C	Medium	16.60	3.95	□

COMPROMISE

Digital photo camera	Size	Reliability	Resolution (megapixels)	Check the digital photo camera that you would buy (check only one)
Digital photo camera A	Pocket	14.40	7.60	□
Digital photo camera B	Pocket	16.60	5.40	□
Digital photo camera C	Medium	18.05	3.95	□

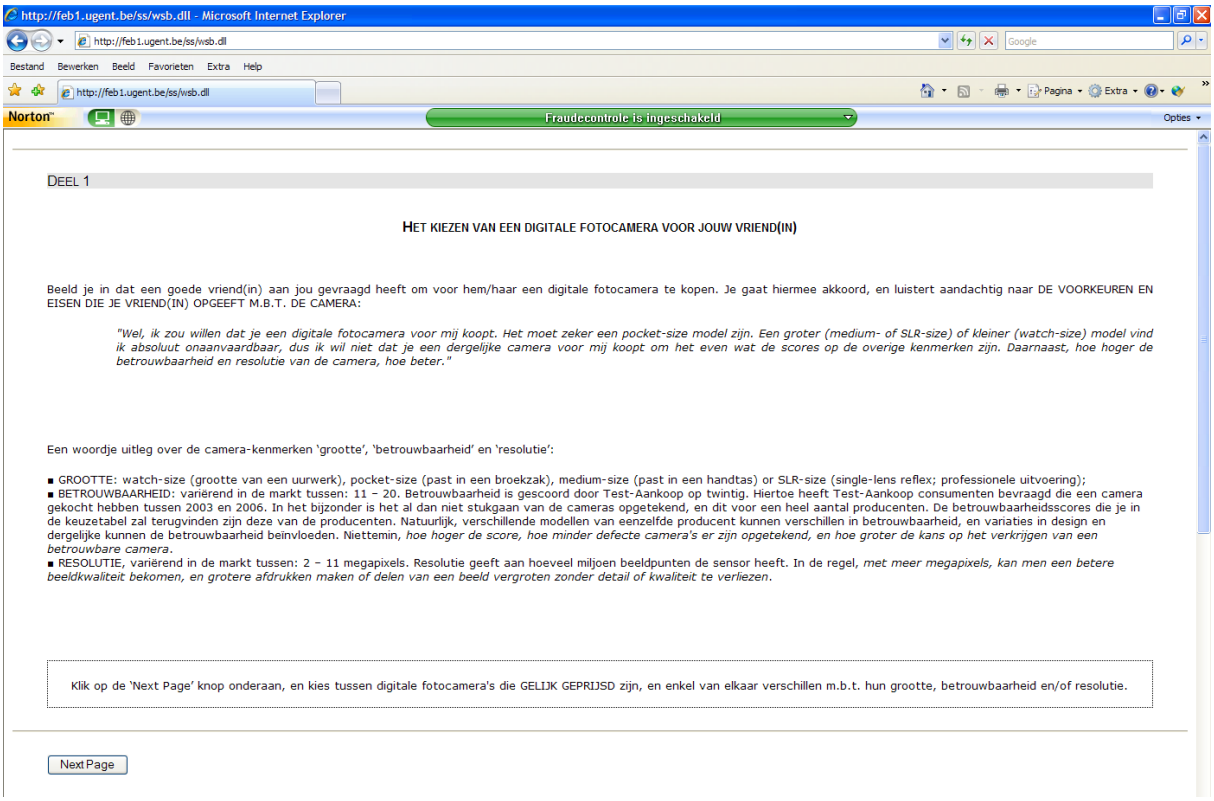
[19] … the higher the score, the better the repair history, and the higher the odds of getting a reliable camera.

[20] … with more megapixels, one can obtain better image quality, and make larger prints or enlarge parts of an image without losing details or quality.

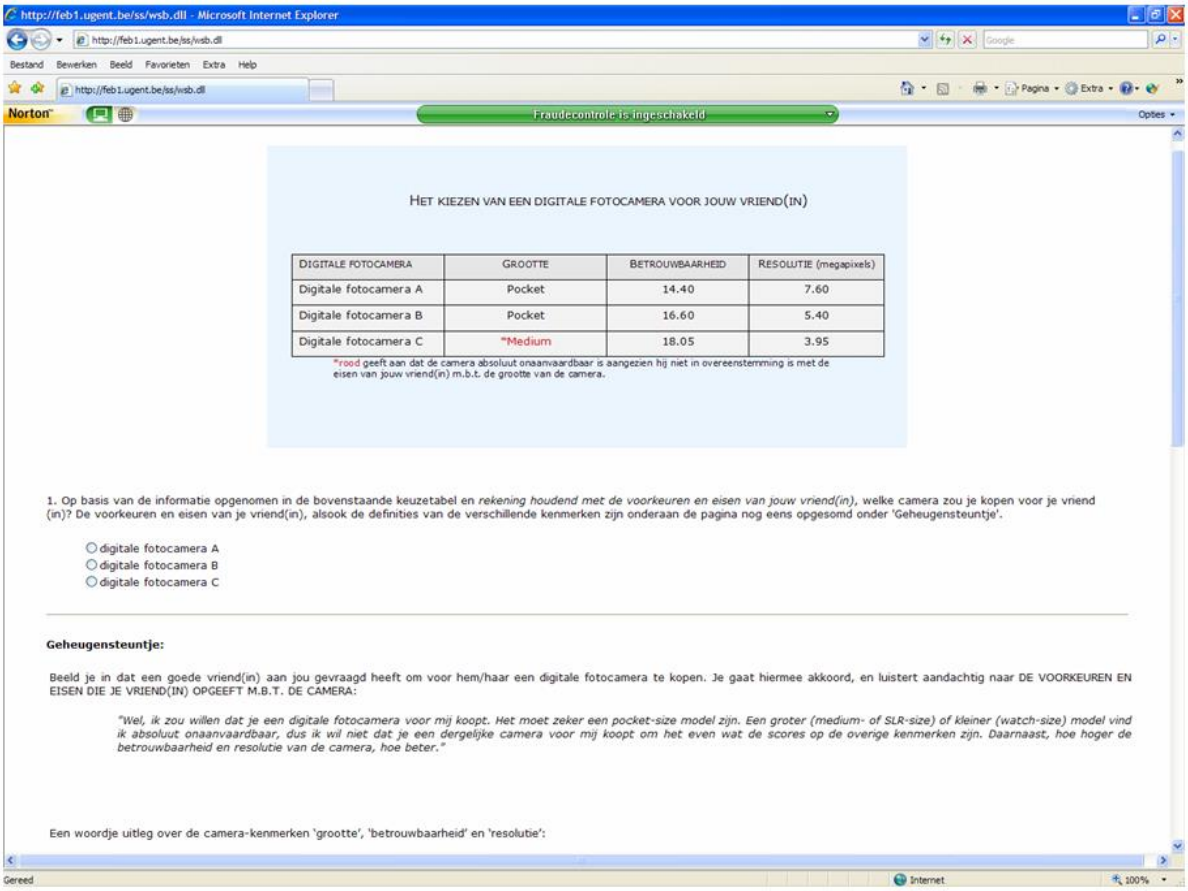
APPENDIX 14:

STUDY 3 – SCREENSHOTS

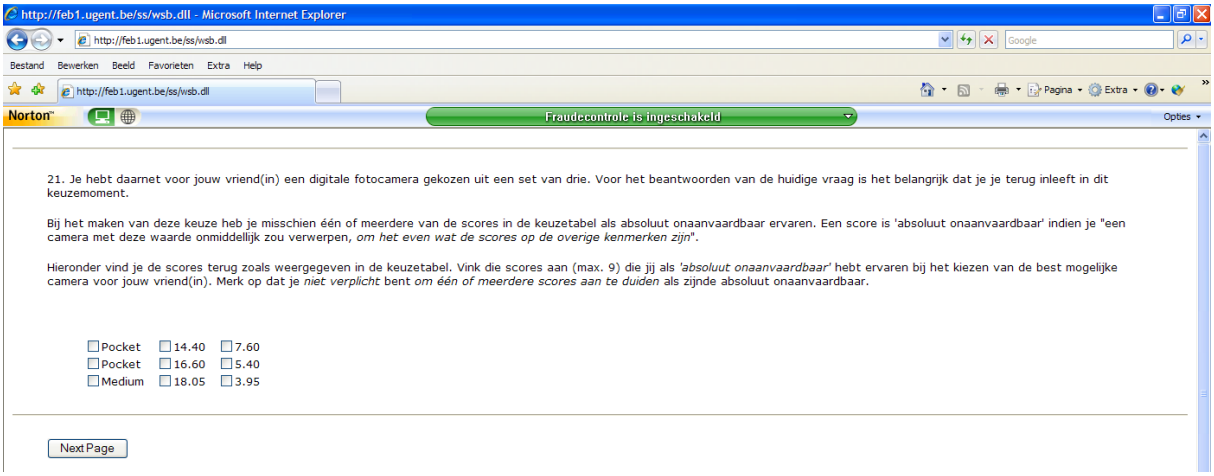
SCREENSHOT - FRIEND'S DEMANDS AND PREFERENCES: HOW TO TREAT THE MEDIUM-SIZED DIGITAL PHOTO CAMERA



SCREENSHOT - DIGITAL PHOTO CAMERA CHOICE: CHOICE MATRIX, UNACCEPTABLE MEDIUM SIZE LEVEL PRINTED IN RED



SCREENSHOT - DIGITAL PHOTO CAMERA CHOICE: ASSESSING THE LEVELS' UNACCEPTABILITY



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